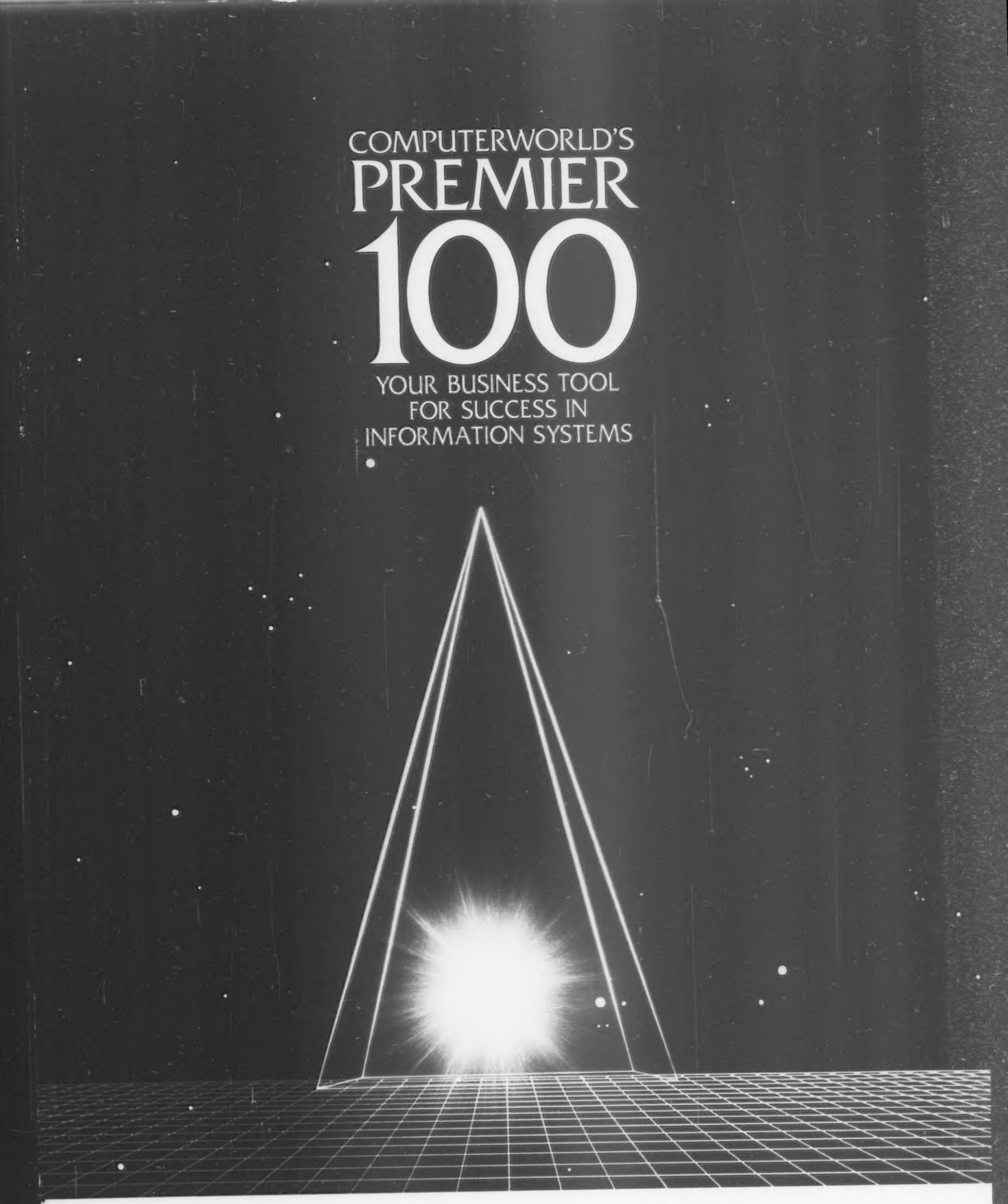

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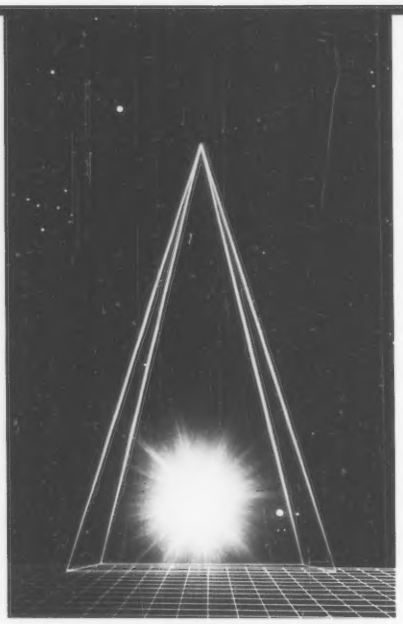

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COMPUTERWORLD

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'It's a mess.' Prime delays big meeting as management-backed buyout firm scrambles over financing questions. Page 92.

China's best-known tech promoters on government most-wanted list. Page 93.

Irate 3380 users left at altar

Late cancellation spurs storage-hungry buyers to seek alternatives

BY ROSEMARY HAMILTON
CW STAFF

IBM took a major step backward in its high-end storage efforts last week that could send customers into the arms of competitors and cost the firm millions on this year's balance sheet.

The firm killed a slated announcement of its long-awaited follow-on to the high-end 3380 disk drive, saying the product did not pass testing procedures.

Meanwhile, IBM did take a step forward on the high-end tape drive front by announcing improvements to its 3480 line. However, the 3480 news, released on the same day as the disk drive disaster, got little attention from users or analysts.

An IBM spokeswoman said last week that the company was unable to state when it would introduce the new disk drive and would not comment on what had gone wrong with its plans.

Unpleasant surprise

Some users contacted were shocked that IBM had discovered a problem so close to announcement time. The firm had gone so far as to alert key customers of an upcoming debut and then pulled the plug just a few days before the event.

"My concern is, why was it so late in the game?" asked George Perera, group director of information systems at Ryder Systems, Inc. in Miami. "They've had a bad history with DASD, and because of that, I'm a little nervous. Obviously, I've decided not to be Serial No. 1 when this comes out."

Perera and other users contacted last week said IBM's news will force them to reassess their storage plans. Some users said they had factored the new disk drive into upcoming projects and will be forced to seek alternatives if IBM does not quickly rectify the problem.

"This is bad news," said Jack Cooper, president of CSX Tech-

Continued on page 91

Kodak hands processing over to IBM

BY CLINTON WILDER
CW STAFF

ROCHESTER, N.Y. — Eastman Kodak Co., in a dramatic example of the current trend toward outsourcing information systems operations, announced last week that IBM will consolidate and manage all of Kodak's major U.S. data center operations for the next 10 years.

IBM will take over Kodak's IS operations within the next two months, hiring 300 Kodak IS operations employees. During the next 18 months, IBM will design and construct a new data center here that will consolidate Kodak's four U.S. data centers — three in the Rochester area and one in Windsor, Colo.

Kodak hopes to save 40% to 50% annually on data center operations as a result of the consolidation, even after paying IBM its fee, according to Katherine M. Hudson, Kodak's vice-president and director of corporate information systems.

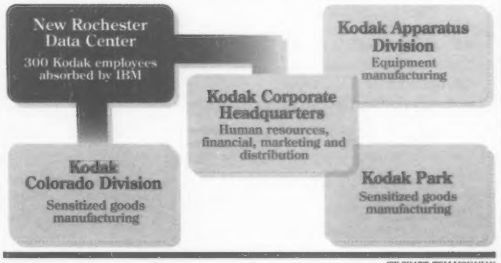
"If we consolidated on our own, it would take us twice as long" to realize the same savings, she said.

Kodak, No. 18 in the Fortune 500, is the largest firm to farm out such a sizable piece of its IS

Continued on page 6

Blue filter

IBM will consolidate four Kodak centers into one and absorb 300 information systems employees into its own work force



CW CHART: TOM MONAHAN

Wang slips deadline as fears grow

BY PATRICIA KEEFE
CW STAFF

LOWELL, Mass. — With projections turning from dismal to disastrous, Wang Laboratories, Inc. delayed release of its fiscal fourth-quarter earnings Friday. Instead, the financially strapped minicomputer maker said it would release those results "and related matters" before the stock market opens today.

Following the shock of Wang's after-tax loss of $63.7 million for the third quarter ended in March [CW, April 24], analysts are anticipating the company's biggest loss ever.

Late last week, some analysts were projecting that the flood of red ink would range from $160 million to $200 million despite radical cutbacks that have sliced 3,000 positions from the payroll in the past quarter.

Wang declined to comment on the delay, but analysts and a source close to the company said it was probably engaged in eleventh-hour discussions last week with its bankers in an effort to renegotiate credit terms.

There was speculation that Wang intends to take as many hits as it can this quarter. In addition, a reported internal Wang comment that the firm does not expect to be profitable until its third fiscal quarter of 1990 prompted analysts to predict

Continued on page 92

Collider's colossal computing conundrum

BY J. A. SAVAGE
CW STAFF

DALLAS — M. G. D. Gilchriese got one answer when the U.S. Senate voted overwhelmingly to fund the Superconducting Super Collider project last week, following up an earlier vote in the House of Representatives.

The rest has been questions. Not just the big question of trying to determine the origins of matter, but other prickly ones. Questions such as how to manage a million lines of code, how to harness a trillion instructions per second of power and how to make sense of a terabyte of data coming at you every second.

"The amount of computing power we need could be succinctly described as infinite," said Gilchriese, associate director of the physics research division of the supercollider lab.

The project will consist of a 53-mile oval tunnel encircling the town of Waxahachie, Texas, about 25 miles south of Dallas. Inside the tunnel will be two pipes in which beams of protons crash against one another at the speed of light.

The collisions will occur at several experimental stations in the route, each with millions of sensors designed to pick up and filter data from the collisions in real time.

The supercollider lab will eventually cost about $5 billion, Gilchriese said. Computer-related capital costs are expected to run to about $1 billion, not including design and development costs, according to government estimates.

Gilchriese said he estimates

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NEWSPAPER

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8 Indicted last week, Robert T. Morris Jr. has the dubious distinction of being the object of the first federal computer virus prosecution.

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93 China's Stone Group under pressure for supporting pro-democracy movement.

Quotable

"If you view yourself as an MIS person, you get wrapped up in the technology and the IBM-ese, and the customer begins to be an opponent."

DOUG LEWIS
PRATT & WHITNEY

On the role of the IS executive. See story page 57.

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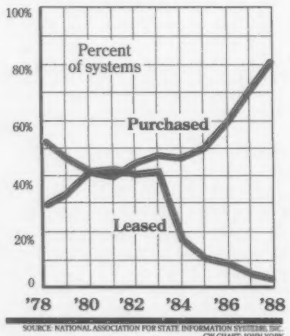
UPDATE

The consensus report of 10 distinguished law professors representing 10 law schools holds that phrases such as "look and feel" and "total concept and feel" obscure rather than assist in applying copyright law to the protection of software and user interfaces. The report, sponsored by Arizona State University, also found that "functionally optimal" aspects of user interfaces (read: garbage cans) should not be protected by copyright law. Ashton-Tate, Apple, *et al.* had better hope none of these distinguished professors decide to don the judicial black robes.

States prefer to buy

Unlike a decade ago, the majority of state agencies now own their computer systems rather than leasing them



SOURCE: NATIONAL ASSOCIATION FOR STATE INFORMATION SYSTEMS, INC.
CW CHART: JOHN YORK

EXECUTIVE BRIEFING

■ **Kodak's major U.S. data centers** will be consolidated and placed under IBM management as a result of a 10-year contract signed last week. Under the pact, Kodak hopes to save 40% to 50% annually on data center operations, even after paying IBM's profit margin. Kodak is the largest company in the recent wave of firms opting to outsource its host processing. **Page 1.**

■ **Some of IBM's biggest customers are angry.** The long wait for the next generation of high-end disk drives — the replacement for the 8-year-old IBM 3380 — is going to get longer. That has some mainframe shop managers hinting that they may bring millions of dollars of business to such IBM plug-compatible rivals as Amdahl and National Advanced Systems. IBM acknowledged last week that the planned announcement of a 3380 follow-on has been postponed. Meanwhile, IBM introduced expected performance enhancements to its 3480 cartridge tape drive. **Page 1.**

■ **Being a multinational** does not a global corporation make. Because a company does much of its business in the international market does not mean it is global in nature. Researchers note that the firm must have a communications infrastructure and knowledge management approach in place so that users can readily access information regardless of where it is located. **Page 57.**

■ **IS professionals who have worked overseas** report that they encountered difficulties but generally say they would do it again. The obstacles include both technical hurdles and foreign customs, particularly attitudes toward women. One recruiter reports strong demand for IS people in Europe and Australia. **Page 74.**

■ **The finger of blame** was officially pointed at Robert T. Morris Jr. last week when a federal grand jury handed up an indictment charging the former Syracuse University graduate student with being the progenitor of the worm virus that shut down thousands of computers last fall. **Page 8.**

■ **How will IS implement new connectivity solutions** if it doesn't understand where it is today? Before adding new capabilities, IS should thoroughly identify and evaluate its company's current information infrastructure as well as the user requirements. This procedure, known as a connectivity audit, will allow IS to gauge network performance and to estimate the impact of changes made to the infrastructure on network performance. **Page 61.**

■ **The days of IS managers not caring** about home computing may be gone. Today, those managers must recognize that more home PC users are actually their own corporate users running their daytime in-office business applications — such as spreadsheets — on a take-home basis. **Page 33.**

■ **Information centers** have joined corporate and IS training organizations in providing PC instruction for end users, often creating a lack of consistency and control over the instruction. The answer may lie in reassigning information centers so that they report to the IS training organization. **Page 88.**

■ **The weather report for computer industry earnings** is mostly cloudy and unseasonably cool. The bright spots last week included AT&T, Compaq, Computer Associates and Microsoft, while the reports from DEC, Cray Research, Unisys, Amdahl and others felt the chill of lower earnings. The weather turned miserable in the environs of Data General, Control Data, Phoenix Technologies, Sun Microsystems and — particularly — Wang Laboratories, which all reported or projected serious quarterly losses. **See stories on pages 1, 8, 16 and 65.**

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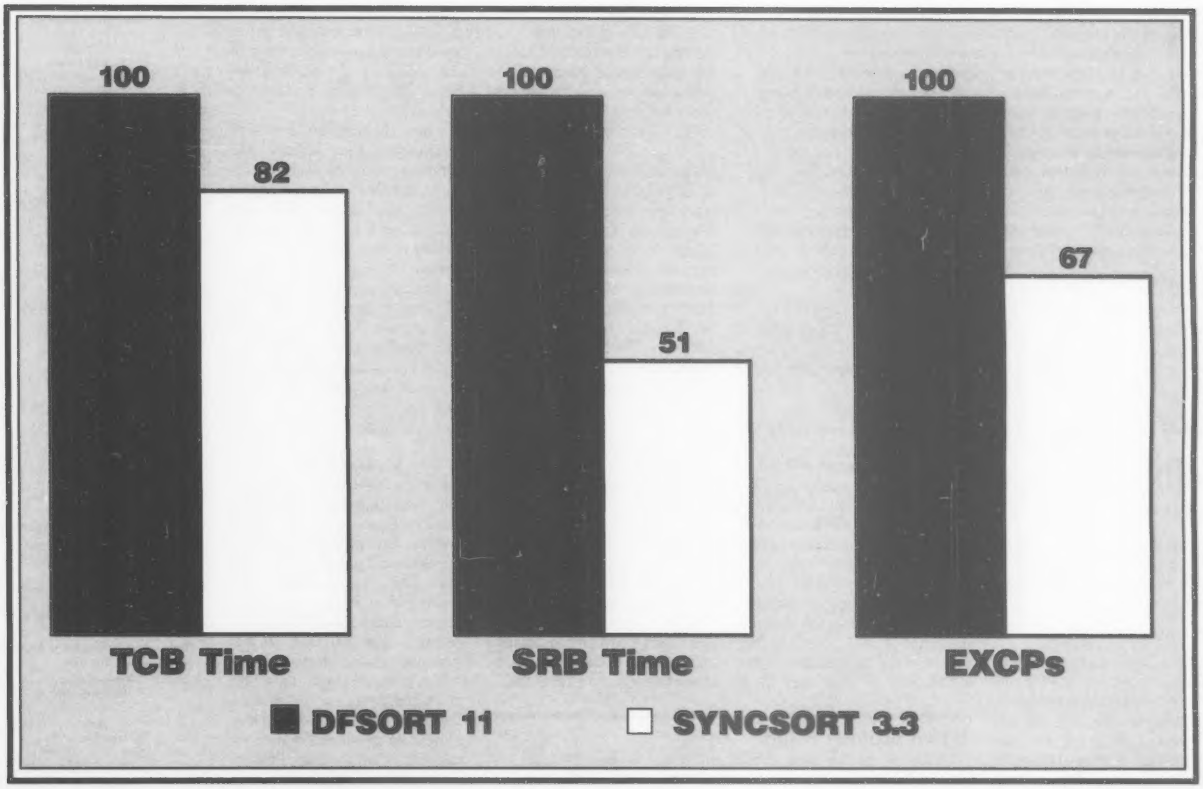

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States shore up IS service role

BY MITCH BETTS
CW STAFF

SYRACUSE, N.Y. — Under increasing pressure to "fill in the gaps left by federal aid reductions," state governments are turning to information systems to improve the delivery of public services, according to a Syracuse University study to be released this week.

"Information resources are now deeply and inexorably linked with service delivery, regulation, monitoring and decision making in state government," said Sharon L. Caudle, the assistant professor who directed the year-long study that surveyed 2,200 state-level officials.

For example, states are using geographic information systems to track toxic substances and are exploring the use of automated teller machines to dispense everything from welfare benefits to tickets for state-sponsored recreation events.

Information that executives in several states gave to *Computerworld* concurred with the study's findings.

"In Connecticut, there has been a tremendous use of information technology as a resource for assisting managers and the decision-making process — something that has totally amazed us in the data processing profession," said Franklin D. Johnson, director of management plans and policies at the state's Bureau of Information Systems and Data Processing in Hartford, Conn.

"Our managers, instead of looking at it as something to fear, are quite excited about using information technology to get their services delivered to the client," Johnson said.

Virginia is for movers

In Virginia, which is trying to attract new industry, an information system is used to compete against other states by finding sites for economic development, according to Michael J. Durkin, director of policy and planning at the Virginia Department of Information Technology in Richmond, Va.

State agencies are slowly maturing in their use of information technology, the study concluded, as they establish statewide information management policies.

Consequently, the IS department is rising on the organizational chart of state governments, noted Nancy M. Abraham, director of the Department of Information Services in Olympia, Wash. Abraham is the equivalent of a chief information officer and, as a member of the state executive cabinet, reports directly to the governor.

Still on short end

However, the researchers said that state IS managers consistently complained about budgetary constraints and a shortage of trained personnel due to low pay schedules.

The first-ever study of information resources management in state governments will be released at the annual meeting of the National Association for State Information Systems in Atlanta.

Since 1983, many states have reorganized their offices and planning processes to include IS, communications and, sometimes, office automation in a comprehensive management strategy, the researchers reported.

However, state managers continue to neglect the records management function, the study added, and only a few states have tackled such data administration issues as developing data dictionaries.

Stating the case

The study by Syracuse University researchers came to the following conclusions about the state of information resources management in state governments:

- In 1989, state governments invested $19.9 billion in information technology and resources, an amount that will increase by at least 7% annually. The state of California alone operates 35 mainframes, 800 minicomputers and 14,000 personal computers.
- There are more than 420,000 IRM-related jobs in the U.S., representing nearly 20% of state executive-branch employees.
- States need to take information systems out of the "overhead expenses" category of their accounting systems and break those expenses down so that the data can be used to evaluate the costs and benefits of information technology investments.
- Procurement reform is a high priority for most IRM offices. Competitive procurements for information technology take about 12 weeks.
- States want to share more data among various agencies, but they are often stymied by privacy laws.

Collider

FROM PAGE 1

that each experimental station could have thousands of CPUs to detect and measure the energy of the particles given off at a collision. The lab expects 100 million collisions per second.

These thousands of CPUs, expected to incorporate parallel reduced instruction set computing (RISC) architecture, will not only have to collect but also filter the amount of data emanating from each experiment. "Each time particles collide, something happens. But it's not necessarily something you're interested in," Gilchriese said. He said he expects reductions to be made from 100 terabytes "to 10, or 100 [megabytes] at most."

No one yet knows how that filtering will be done. Artificial intelligence programming will not fit the needs of filtering information, although it can be used in machine control. Gilchriese said the lab's researchers were exploring neural networks to make heuristic decisions.

On top of the undetermined number of experimental stations and their need for compute power is management of the entire "racetrack." The central computers will have databases to track each piece of equipment. For instance, the lab will incorporate 10,000 magnets. "We have to know where they are and their pedigree," Gilchriese said. He referred to database management as the "grundy work."

The biggest need for power will be in analyzing the results. In addition to getting in filtered data, the 1,500 scientists expected at the lab will have to run simulations of what they think happened with known physics parameters and compare that with the raw data.

Gilchriese said that the simulations will also be done on parallel computers. "Our simulation is suited to simple parallelism. You can take information from an event and parcel it out to different CPUs," he said.

While it is still unknown what kind of hardware will be used, something is known about software development. It will take a Herculean effort to coordinate a million lines of code written by researchers around the world.

The software may not be in the scientifically accepted Unix operating system. Researchers are investigating platforms being developed at universities.

The lab in Waxahachie will not be the first to implement parallel computing to analyze supercollider data. Since the mid-1970s, the Stanford Linear Accelerator Laboratory in Palo Alto, Calif., has conducted experiments in its two-mile-long positron collider. In Batavia, Ill., Fermilab now has the world's most powerful accelerator.

Yet the SSC will have 10 times the power of Fermilab's Tevatron. "The two labs are like comparing apples and oranges," said Fermilab's Jack Pfister, manager of computing services.

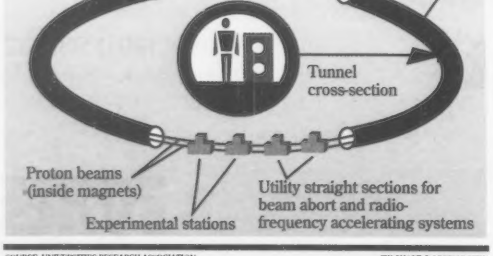
At the Stanford lab, Charles Dickens, director of computer services, also said any comparison would be difficult. Stanford uses parallel processing, but it is not synchronous. Data in IBM mainframes is downloaded and divided to be crunched on eight special-purpose processors.

"[The Stanford lab] tends to have less noise, a smaller amount of data to handle," Dickens said. "The SSC has a horrendous computing problem. They don't know how to attack it."

In 1998, when the lab is expected to be operational, Gilchriese may be able to address the underlying question in which he, as a physicist, is most interested: Just what really happened in the early microseconds of the development of the universe?

When protons collide

The Superconducting Super Collider will be measuring millions of proton collisions per second in the 53-mile oval tunnel



SOURCE: UNIVERSITIES RESEARCH ASSOCIATION
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TN	Memphis	Sept 19*c*
	Nashville	Aug 17*f*
TX	Austin	Sept 29*fpa*
	Dallas	Aug 14*pa* Sept 7*f*
	Houston	Aug 17*cf* Sept 21*l*
	San Antonio	Sept 28*fpa*
UT	Salt Lake City	Sept 7*c*
VA	Richmond	Sept 21*l*
WA	Bellevue	Sept 20*fpa*
	Spokane	Sept 26
WI	Madison	Aug 17*f*
	Milwaukee	Sept 12*f*

The following key indicates additional afternoon seminars that are offered with these seminar dates:

a Macintosh Networking
c CASE/Application Tools
f Oracle Financials
i Oracle Int'l User's Group '89
l Oracle Mail
m Computer Integrated Manufacturing
p PC Product Solutions
u Unix

Please note:

* Seminars held for Federal Government only.
\# Only the afternoon seminar is held that day.

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1:IBM Journal of SAA 2:DATAPRO survey, August 1988, companies with sales over $10 million 3:Donaldson, Lufkin & Jenrette report

NEWS SHORTS

People count too, says Young

Hewlett-Packard Co. Chief Executive Officer John Young warned last week that U.S. business cannot afford to invest in computer-integrated manufacturing and not invest in its work force. "The challenges we face in achieving manufacturing competitiveness are not solely technological — they're sociological," Young told a manufacturing conference. Young went on to say that teamwork in the factory is just as important as automating the factory.

Price cuts from Excelan

Excelan, a Novell, Inc. company, last week announced price reductions ranging from $50 to $200 on its Kinetics Etherport product line, effective tomorrow. Etherport provides Apple Computer, Inc. Macintosh-to-Digital Equipment Corp. VAX connectivity. The price cuts are the latest in a series of network adapter cost reductions enacted by Novell.

Lotus ships Release 2.2

A month after shipping 1-2-3 Release 3.0 for high-end personal computer users, Lotus Development Corp. last week announced customer deliveries of 1-2-3 Release 2.2. That version, intended for users working within the 640K-byte memory limit of MS-DOS, includes a file-linking feature that breaks up large applications into more manageable worksheet files and an enhanced Allways feature for typeset-quality output.

Smartcard founder moves on

Arlen Lessin, founder and chairman of Smartcard International, Inc., has left that company to launch The Lessin Group, Inc. (TLG), described as an international technology consortium. TLG's mandate is to work with senior management of public, private, government and educational organizations worldwide to link innovation to market and/or "user realities." Lessin will remain on Smartcard's board as chairman emeritus.

The dark side of lasers

Laser printers and color copiers are being used to elevate the art of check forgery to new heights, according to Jack Scott, loss prevention manager at JBS Associates, a check-guarantee company in Ringwood, N.J. Technology has made it easier for crooks to create bogus certified and cashier's checks; as a result, the bad paper is showing up more often, he said. Scott, a former detective, urged businesses to take extra care to verify the legitimacy of checks they receive.

CA buys security software

Computer Associates International, Inc. last week acquired Cortana, a PC security software product from United Software Security, Inc. in Vienna, Va. The Garden City, N.Y., software giant said that in the near future, it will disclose pricing, availability and the product's role in its multiplatform security strategy, particularly in networked computing environments.

Covia extends Apollo's reach

Turk Hava Yollari Airlines, the airline of Turkey, has become the latest participant in the Apollo on-line reservation system, Apollo operator Covia Corp. announced last week. Covia also said that Bahamasair, a regional airline for the Bahamas and the eastern U.S., had joined the Apollo booking system, which is available to some 10,000 travel agencies worldwide.

Integration move by Bell Atlantic

Bell Atlantic Corp. and American Management Systems, Inc. last week announced the formation of Bell Atlantic Systems Integration Corp., a joint venture that will provide computer and network integration services. It will be based in Arlington, Va. Bell Atlantic is a regional Bell holding company based in Philadelphia; AMS is a software and professional services firm based in Arlington.

Spreadsheet suit: One size fits all

BY RICHARD PASTORE
CW STAFF

NEW YORK — Six major spreadsheet software vendors, including Lotus Development Corp. and Microsoft Corp., were named in a technology patent infringement lawsuit last week that could force them to pay 5% royalties to the patent holder.

New York-based Refac International Ltd. filed a civil suit in U.S. District Court here charging violation of its exclusive patent.

The patent, obtained from Canadian software firm Forward Reference Systems Ltd. [CW, July 24], covers "computers and computer processing for carrying out fundamental operations used in spreadsheets," the company said.

The defendants named were Ashton-Tate Corp., Borland International, Inc., Computer Associates International, Inc., Informix Software, Inc., Lotus and Microsoft.

"We are seeking royalties going back six years and going forward until the expiration of the patent" in the year 2000, Refac President Philip Sperber said.

Sealed with a kick

Sperber said he sent letters to the defendants Thursday. Of the six companies, only Microsoft and Lotus were aware of the action, though they said that as of Thursday night they had not received official notification. Tom Lemberg, Lotus vice-president and general counsel, said, "I would be very surprised to find that a patent awarded six years ago has been infringed by our product. I'm not aware that there are any such patents out there."

Other companies in other U.S. court districts "will be receiving notices of infringement from us," Sperber said. "Where else we sue will depend on whether those companies express interest in obtaining a license from us."

He added that the company is deferring action against distributors and major users pending the outcome of the suit, but a royalty schedule that the company has drawn up does list a 3% royalty fee for users.

"I think this is another in a series of questionable lawsuits that have popped up in the PC industry in the last two to three years," said Nancy McSharry, an analyst at Framingham, Mass.-based market research firm International Data Corp.

"It will be more of a pain in the neck than anything else to the larger companies," McSharry said. "But it will squeeze out the little players."

Sperber countered that he is "telling the companies all we're interested in is a reasonable royalty — it isn't our wish to put anybody out of business. All they have to do is adjust the sales price for their software product so it includes any royalty that they have to pay."

McSharry also charged that the fear of getting hit with an infringement lawsuit stifles innovation at fledgling companies. "They want to take as few risks as they can, considering they're in a high-risk arena," she said.

Kodak

FROM PAGE 1

function since General Motors Corp. acquired Electronic Data Systems Corp. in 1984.

Kodak will retain 1,500 IS employees and all applications development, as well as oversight and long-term planning.

"It is not in Kodak's best interest to be investing in all the infrastructure it takes to run the data center," Hudson said. "We should be investing in our core businesses, and applications development should be as close to the customer as possible."

IBM named one of its top internal IS executives, Director of Information and Telecommunications Systems Strategies Frank Palm, to move to Rochester and head up the Kodak project for IBM's National Service Division (NSD).

NSD has been rapidly expanding its service offerings to include data center design, construction and relocation [CW, April 10], but this will mark the first time it will stay on to run a data center on a long-term basis.

"It's a bold move for Kodak, one that I think other companies will take a hard look at as a result," said George Hathaway, a principal at Index Group, Inc., a Cambridge, Mass.-based IS consultancy. "In any marriage of sorts, there are risks and bumps in the road. The trick will be anticipating where the problems may loom and getting out ahead of them."

The most obvious problem area is the use of non-IBM technology at Kodak, an issue that Hudson said was a concern early in the negotiations. To address that and to ensure that Kodak uses the best technology available, she said two committees will oversee the project: a strategy committee of both IBM and Kodak senior executives, and a technology committee with representatives from both firms as well as outside consultants.

Kodak's Hudson *says non-IBM technology is a trouble spot*

"We want to make sure we're looking at Kodak's strategy — not IBM's — with regard to [technologies such as] SAA, networking and ISDN," she said.

Although Hudson said the original motivation for the project was strategic focus and not cost savings, the announcement comes at a time when Kodak is examining virtually all of its support functions for possible outsourcing. The $17 billion firm is carrying about $10 billion in debt from its 1988 acquisition of Sterling Drug and last week announced a $225 million write-off, which analysts said is only a taste of things to come.

"They're looking at every support service you can name — legal, accounting, public relations, security," said J. Robert Maney, a Prudential-Bache Securities, Inc. senior vice-president based in Rochester. "If they have any hope of maintaining profit margins, they have to get costs down."

Earlier this month, Kodak signed an estimated $150 million contract with Businessland, Inc. to take over all of Kodak's personal computer procurement and support in the U.S. for five years. Some 90 members of Kodak's PC support employees will become Businessland employees or be offered jobs elsewhere in Kodak. Kodak is also considering outsourcing some telecommunications functions to the local telephone company.

The IBM contract will not affect Kodak's attempts to transfer some mainframe applications to local-area networks in its business units [CW, July 24], said Gary Savarese, project manager for corporate IS. "There will always be the need for a mainframe environment, and that's what IBM will be running for us," he said.

Kodak began to evaluate outsourcing of data center services after Hudson joined the firm in early 1988. It began negotiations with EDS, which it later dropped as a possible partner some months after IBM submitted its proposal. Hudson said operations employees warmly received Palm's "welcome to IBM" address last week but denied that EDS' reputation for hard-line management caused Kodak to choose IBM.

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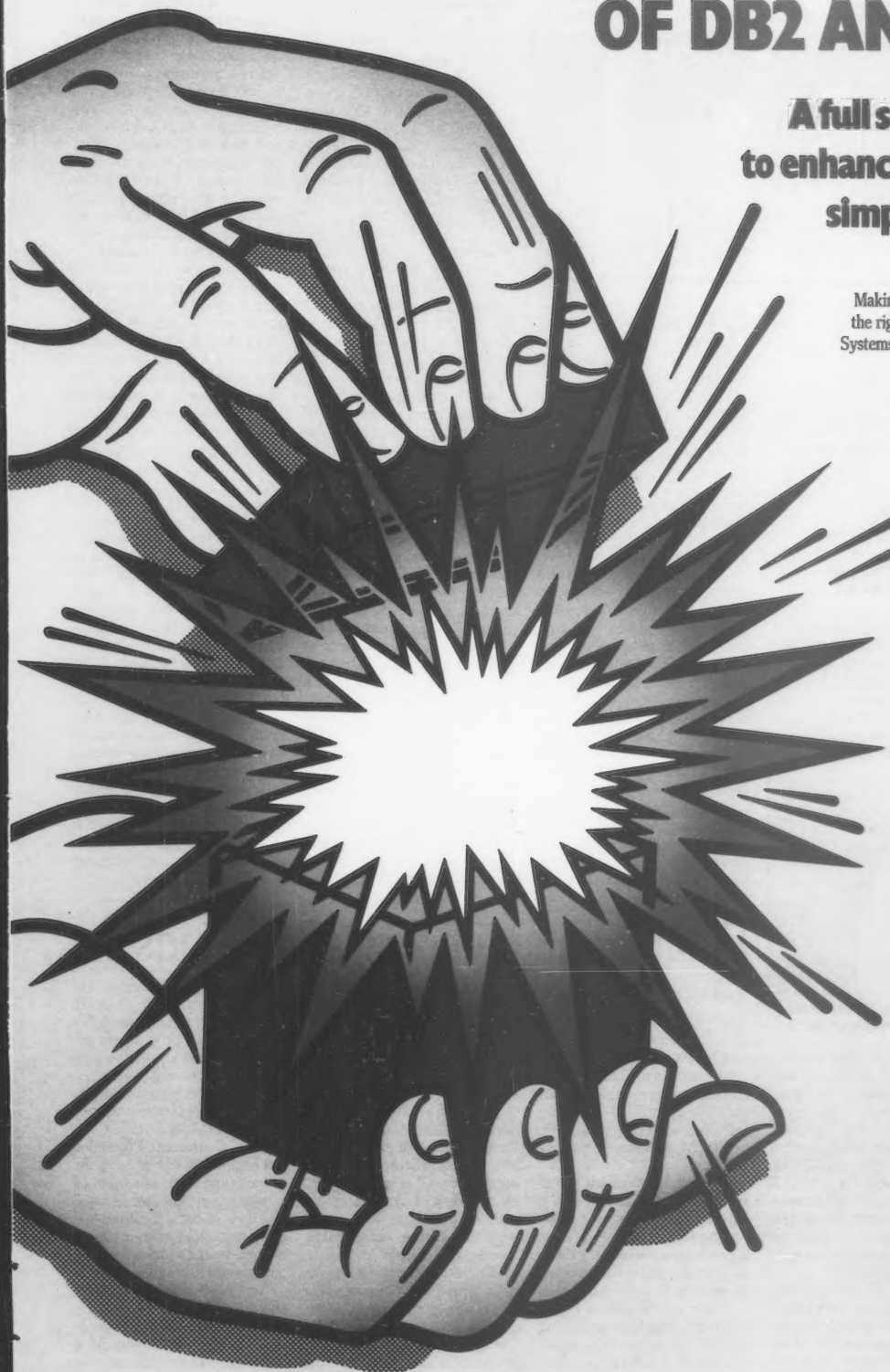

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6-CWX-890731

DEC growth in U.S. weakens

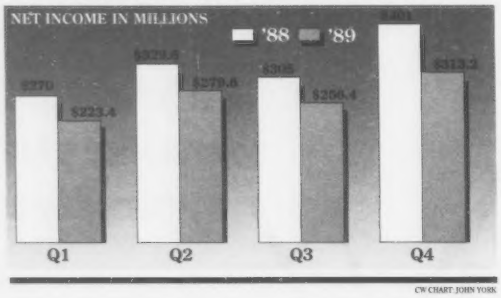
BY RICHARD PASTORE
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp.'s sagging profit growth and limp revenue gain for this past quarter suggest that these are the company's dog days. Analysts agreed, however, that DEC will still be sweating it out months after the sultry weather has given way to frost.

DEC reported $313 million in net profit for its fourth quarter last week, 22% less than in the same period a year earlier, sparking renewed calls by stock analysts for cost controls through layoffs. The company's $3.5 billion quarterly revenue was only 5% more than in last year's comparable quarter.

DEC's fiscal year, which ended June 30, followed the same general pattern as the quarter. Its $1.1 billion in net profit was 15% lower than the previous year. The $12.7 billion revenue figure was 11% higher than that of a year ago.

Marking time?
DEC closed out fiscal year 1989 significantly off the pace of one year earlier



CW CHART: JOHN YORK

Company President Ken Olsen attributed the quarterly downturn to "lackluster conditions in the U.S. and the strengthened dollar depressing overseas results."

Overseas markets experienced double-digit growth and would have been even stronger if the currency translation had not lopped $100 million, or 3%, off of revenue growth, according to John Jones Jr., an analyst at Montgomery Securities.

The greater-than-anticipated overseas growth would have been a pleasant surprise for Wall Street, but it was doused by less-than-expected growth in U.S. markets. Those factors brought quarterly figures "roughly in line with expectations," said Michael Geran, an analyst at Nikko Securities Co. International.

Analysts agreed that, along with DEC's hiring freeze, layoffs are needed to shore up the top-heavy firm. David Wu, an analyst at S. G. Warburg & Co., said he expects an IBM-style "nonlayoff layoff" in the early 1990s.

Watch out

"Ken Olsen, like most people, doesn't like to lay people off, but something will have to be done," Wu said. "If I were an average employee at DEC — anywhere outside of the top 20% in my category — I wouldn't consider my job very secure right now."

Bob Djurdjevic, president of consulting and research firm Annex Research, added that DEC is facing the inevitability of reducing staff during the next couple of quarters. "So maybe in two year's time, their star will shine again," Djurdjevic said.

Jones said he expects DEC to languish for another six months: "I think we have two more year-over-year down quarters to go before we see some growth."

DEC does not have a full product line, according to Jones. "They have no [VAX] high end, and their MIPS-based workstation is not completely rolled out yet," he said. "If there's a slowdown in the economy that's greater than the modest one we're expecting, they don't have the capabilities to withstand it."

Geran said he expects DEC to suffer until its products resuscitate it toward the end of the calendar year — halfway through its 1990 fiscal year, which began July 1. "Fiscal 1990 is going to be a tale of two cities — a weak first half and a strong second half," he said. He predicted the halves will even out and give DEC a flat year for earnings.

Morris indicted in Internet virus affair

BY MICHAEL ALEXANDER
CW STAFF

SYRACUSE, N.Y. — Robert T. Morris Jr., the alleged progenitor of the worm program that shut down thousands of computers on the nationwide Internet network, was indicted last week in a case that the U.S. Department of Justice said is the first federal prosecution of a crime involving a computer worm or virus.

It is also the first federal prosecution of a case under a provision of the Computer Fraud and Abuse Act of 1986, the law that makes it a felony to "intentionally access a federal interest computer without authorization," said Mark D. Rasch, a trial attorney with the fraud section of the criminal division of the Justice Department.

Morris is scheduled to be arraigned on Wednesday before Gustave J. DiBianco, the U.S. magistrate in Syracuse. A trial date has not been set, however.

Morris was named in a single felony count for allegedly paralyzing as many as 6,200 computers on the Internet computer network with a worm program in November 1988.

In its indictment, the grand jury charged Morris with gaining access to university and military computers without authorization, preventing authorized access to those computers and causing losses of more than $1,000, all in violation of the Computer Fraud and Abuse Act.

Rasch declined to comment on the nine-month delay in bringing charges against Morris, who was identified by news reports as the alleged perpetrator within days of the incident. Rasch also declined to comment on the government's evidence or the specifics of the indictment.

Morris is *first to be indicted under computer fraud act*

"I don't know what evidence the [government] has," said Thomas Guidoboni, the lawyer representing Morris. The provisions of the 1986 computer crimes law under which his client has been indicted are ambiguous, he said, and the government will have difficulty proving its case.

The indictment alleges that Morris released a computer worm from Cornell University on Nov. 2 last year.

According to the charges, Morris is alleged to have gained access to computers at the National Aeronautics and Space Administration's Ames Research Center in Moffett Field, Calif.; the U.S. Air Force Logistics Command at Wright Patterson Air Force Base in Dayton, Ohio; the University of California at Berkeley; and Purdue University in West Lafayette, Ind., among other sites.

The indictment charges that the virus allegedly caused numerous computers to shut down. "Morris is alleged to have caused substantial damage at many computer centers resulting from the loss of computer services and the expense incurred in diagnosing the virus and eliminating its effects," said Frederick J. Scullin, U.S. attorney for the Northern District of New York.

If convicted, Morris could receive up to a five-year sentence and a $250,000 fine. He could also be ordered to make restitutions to those affected by the renegade program.

Morris has steadfastly refused to comment publicly on his alleged involvement in the worm episode. He is believed to have recently been living in the Boston area and working at a computer software company in Cambridge, Mass. "Morris plans to plead not guilty and contest the case," Guidoboni said. He will also ask for a jury trial, according to Guidoboni.

The government may have difficulty prosecuting computer virus-type incidents, according to a report on computer security and the Internet worm episode issued earlier this month by the U.S. General Accounting Office. There is no federal law directed at crimes involving computer viruses or worms, and the 1986 computer crimes law contains terms that are not well defined.

Under the law, prosecutors must prove that Morris intentionally and without authorization set out to alter, damage or destroy information in a federal interest computer, for example. However, the act does not define "information," according to the GAO's report.

Morris reportedly has maintained that the virus was intended to be benign and was ostensibly concocted to point out Internet's security weaknesses. A flaw in the worm program caused it to replicate uncontrollably until it clogged the memories of the computers targeted by the renegade program.

Computer law unclear, GAO finds

BY MICHAEL ALEXANDER
CW STAFF

There are numerous factors that may hinder prosecution of computer virus-type incidents, according to a report released earlier this month on computer security and the Internet worm by the U.S. General Accounting Office.

There is no federal law specifically directed at crimes involving computer viruses; thus, prosecuting these sorts of incidents depends on whether an individual's actions fall under an existing statute, the GAO said.

Under the provisions of the Computer Fraud and Abuse Act of 1986, it is a crime to intentionally access a federal computer without authorization; to access a federal computer with intent to defraud or obtain anything of value; and to alter, damage or destroy information in a federal interest computer and cause losses of $1,000 or more.

The GAO report said that the act defines some relevant terms but not others, and it is not clear whether all virus-type incidents fit within the act's scope. The act does not define "access" and "information," for example. It is also unclear whether the introduction of a virus into a system by electronic mail, a nominally authorized means of entry, would constitute unauthorized access, the GAO said.

The technical nature of computer virus-type crimes may also hinder prosecution, the GAO reported. Prosecutors may lack the technical understanding to handle evidence, and a jury may have difficulty assimilating complex computer-related evidence.

Two bills have been introduced in Congress that are aimed at computer crimes and related incidents. The proposed Computer Virus Eradication Act of 1989 adds a provision to the 1986 computer crimes law prohibiting introducing commands into a computer program specifically to cause expense or loss to the computer user.

The Computer Protection Act of 1989 would prohibit the knowing and willful sabotage of a computer system that resulted in a loss of data, impaired the computer's operation or caused tangible loss or harm to the computer owner.

The GAO concluded its report by noting that Internet remained vulnerable to computer virus attacks and recommended that the president's science advisor and the Office of Science and Technology Policy help establish an interagency group to oversee network security.

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COMP.WORLD

Court closing Apple's Windows

Judge's preliminary ruling narrows the disputed features to a handful

BY JAMES DALY
CW STAFF

SAN FRANCISCO — The legal storm is still far from over, but the black cloud that has hung over defendants Microsoft Corp. and Hewlett-Packard Co. in their 16-month copyright infringement battle with Apple Computer, Inc. is suddenly a lot less threatening.

Last week, a U.S. District Court judge finalized a preliminary ruling in which he held that nearly all of the Macintosh visual displays that Apple contends were wrongfully copied in Version 2.03 of Microsoft's Windows operating system and HP's spin-off program, New Wave, were fair game because they were governed by an agreement signed by the companies in 1985.

Judge William W. Schwarzer's decision eliminated all but 10 of the 189 features that Apple claimed both programs unlawfully duplicated and dramatically scaled down the scope of the suit so that it includes only the overlapping windows components as well as the appearance and manipulation of icons appearing on the Windows and New Wave programs.

Too close for comfort

Although Microsoft was licensed to duplicate the look of the Macintosh for Windows Version 1.0, lawyers for Apple contend that both Version 2.03 and New Wave, which is based on the updated Microsoft program, overstepped the boundaries defined by the 1985 agreement when they copied the "audiovisual expression" of the Macintosh too closely.

Apple's attorneys were clearly disappointed with Schwarzer's decision, claiming that he had misread the original license.

"The only changes Apple agreed upon were changes that would make Windows more different [from the Macintosh user interface], not more similar," said Jack Brown, a Phoenix-based lawyer who is heading up Apple's legal team.

"Microsoft has succeeded in drowning the essence of the case in a sea of inconsequential detail," he said.

With the scope of the license now determined, the focus now turns to the issue of copyright infringement.

The defendants claimed that the remaining legal knots can be easily untangled because the disputed windows and icon features have either not been copyrighted by Apple or are under copyrights that were fraudulently obtained.

"The few remaining issues are minor, and we are confident they will be resolved quickly in our favor," HP Executive Vice-President Douglas Chance said.

Big break

The decision is a key victory for both defendants. Windows has been a big money-maker for Microsoft, while HP has American Airlines on standby, ready to use New Wave as a foundation for a $100 million office information system.

Despite the setback, however, Apple's attorneys were optimistic. Although the remaining points of contention are few in number, Apple claims they represent some important violations. The issue concerning the overlapping windows was "why we were there in the first place," Brown noted.

Some analysts, too, think that Apple will ultimately prevail in the dispute.

"Apple is protecting its legal right to its proprietary Mac interface, which is being more or less openly copied by an industry suffering from a temporary failure of creative thinking," said Michael Murphy, editor of the "California Technology Stock Letter."

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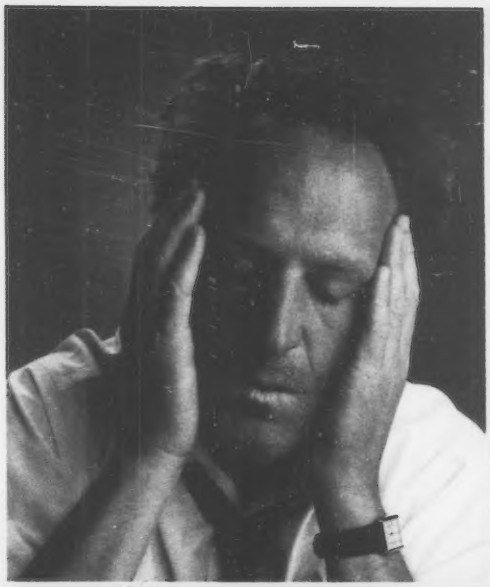

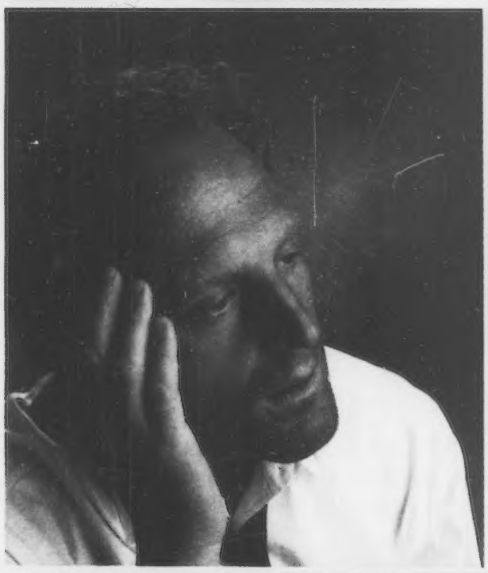

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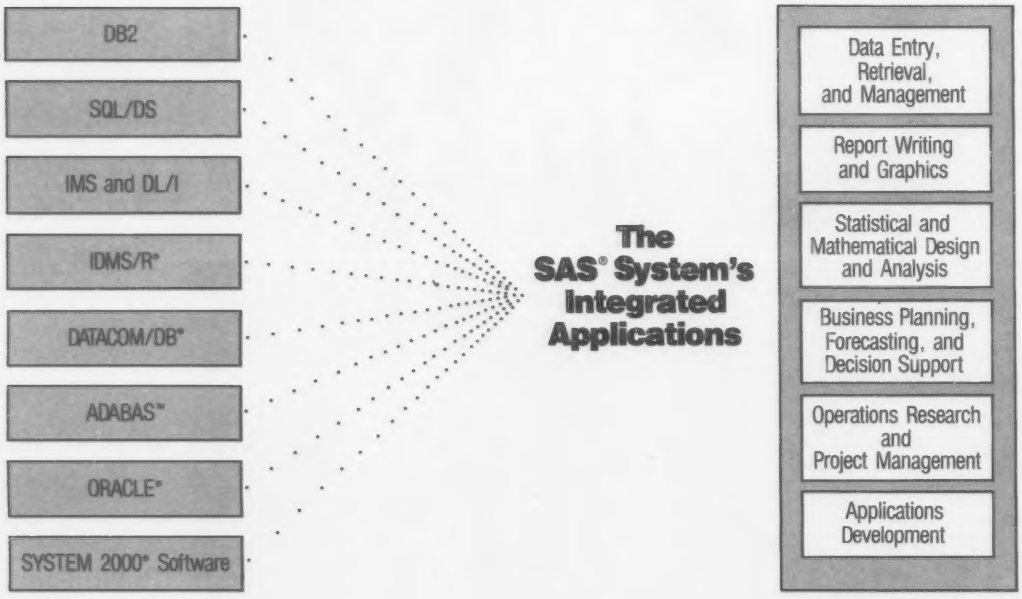

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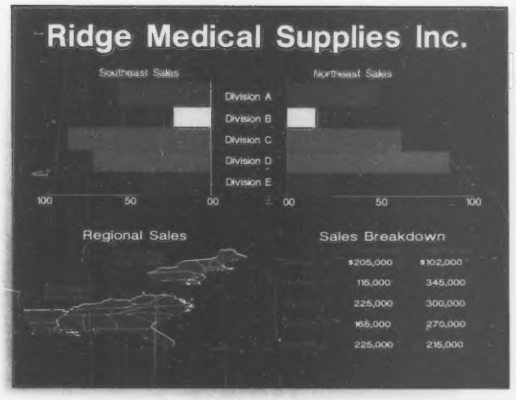

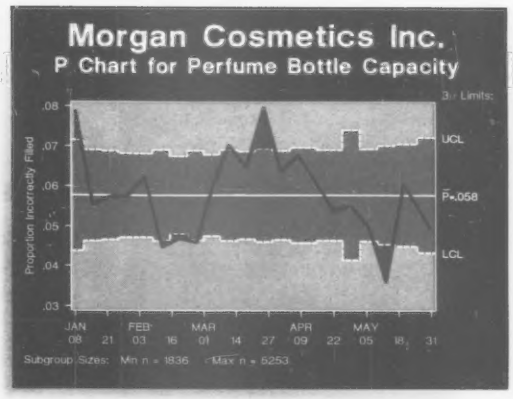

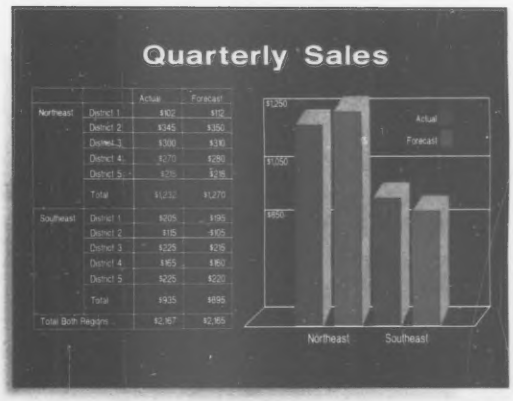

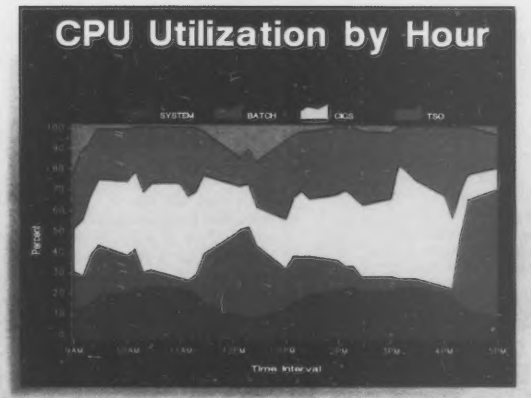

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NAS plugs into MVS/ESA, offers glimpse at Hitachi trove

BY J. A. SAVAGE
CW STAFF

SANTA CLARA, Calif. — National Advanced Systems last week became the first mainframe plug-compatible manufacturer to demonstrate compatibility with IBM's MVS/ESA operating system.

In addition to demonstrating Enterprise Systems Architecture (ESA), NAS hinted that it is ready to join majority-owner Hitachi Ltd. in new moves into the areas of Unix, gallium arsenide chips and parallel processing.

The ESA showing came only days before a similar demonstration that will take place tomorrow by NAS rival Amdahl Corp.

NAS pledged to offer all ESA capabilities plus one of its own. The NAS ESA wrinkle is the Arrow function, which, when in access register mode, will eliminate "at least three machine cycles" in retrieving information, according to Carl Claunch, director of NAS market planning. ESA support will be available in the fourth quarter, the company said.

The company also expressed interest in selling parallel supercomputers and using high-performance gallium arsenide chips for cache memory under development at Hitachi. The Japanese company owns 80% of NAS in partnership with General Motors subsidiary Electronic Data Systems Corp.

Unix coming

NAS also hinted that a Unix operating system is likely to be available in the meantime, with NAS mainframes operating as a "serious server," according to Bob Freund, director of engineering and scientific product development.

"They're trying to put to rest the perception that NAS is less competitive technologywise than Amdahl," said Bonnie Digrius, an analyst at Santa Clara-based Infocorp.

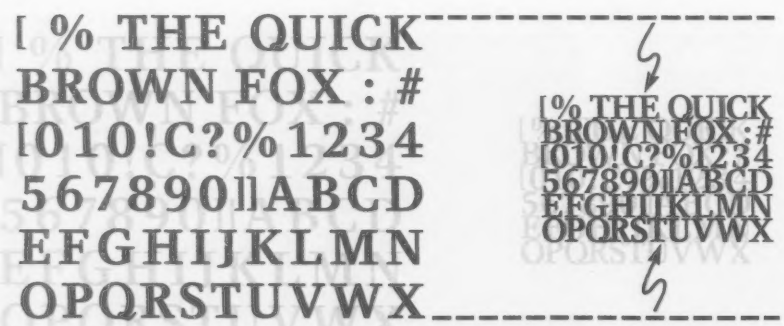
She added, however, that she has yet to see the company come out with a marketing strategy — something that analysts saw as a weakness when it was owned by National Semiconductor Corp.

Compatibility with IBM's latest operating system, announced in February 1988, is a necessary upgrade for plug-compatible manufacturers such as NAS and Amdahl. Both have spent large sums — which neither would specify — to provide ESA compatibility, and both have taken a year to engineer their products since the specifications were released in July 1988. NAS had to re-engineer seven boards to handle ESA and include an extra board to optimize the Arrow function, a spokesman said.

An indication of Hitachi's influence on NAS is Unix development. NAS' own Unix project was canceled in late 1988, before the company was sold by National Semiconductor. However, with Hitachi's sponsorship of the Open Software Foundation, NAS is in a position to adapt a Unix standard rapidly when one is released.

The same leverage exists with Hitachi's research into the fast but expensive gallium arsenide chips. Hitachi is working on bringing down the price, which is now twice the price of silicon, according to Michihiro Hirai, chief engineer at Hitachi's Kanagawa Works in Japan. "Gradually, we have to start using gallium arsenide in mainframe computer products," Hirai said. Hitachi's development of supercomputer technology will likely become part of NAS' future business.

DATA COMPRESSION FOR DB2



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Fleet/Norstar trims its sails, cuts 11 workers

BY ALAN J. RYAN
CW STAFF

PROVIDENCE, R.I. — The computer operations subsidiary of Fleet/Norstar Financial Group trimmed its 64-member systems support services staff last week by 17%, or 11 workers, a company official confirmed.

The employees — part of Fleet/Norstar Services, Inc. — formed part of the operations group that supports computers within the internal bank organizations, said Dave Sheppard, co-chief operating officer of Fleet/Norstar Services. Fleet/Norstar Services was formed more than a year ago after the merger of Fleet National Bank and Norstar Bank created a $29 billion diversified national financial services holding company.

"We feel that we could perform whatever tasks are required with the number of people we have," Fleet spokesman Robert W. Lougee Jr. said.

Sheppard stressed that the recent cutbacks in his area are not related to the January 1988 merger of Fleet and Norstar, which brought about its own set of layoffs more than a year ago.

Lougee said speculation that Fleet had also instituted a hiring freeze was unfounded.

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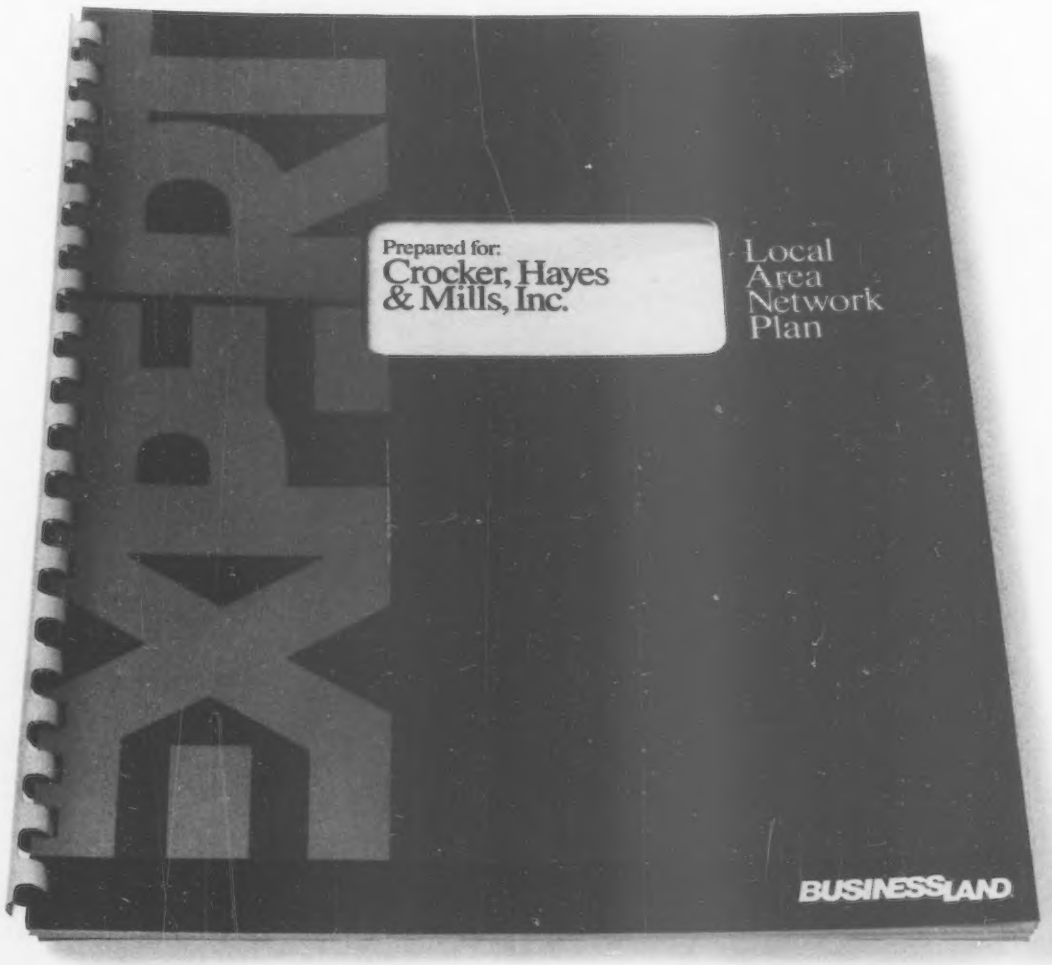

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Unisys profits fade, support still strong

BY ROBERT MORAN
CW STAFF

Industry observers and user group presidents last week viewed the sharp decline in Unisys Corp.'s second-quarter profits as a short-term woe created by the combination of its reorganization with industry-wide flattening in the sales of commercial systems.

Nevertheless, observers said that the Blue Bell, Pa.-based company has at least a year of toil if it expects to reap more from what it has sown.

Despite increased revenue for the second quarter, Unisys netted a meager $53.6 million from $2.57 billion in revenue, compared with last year's profit of $162.3 million from $2.39 billion in revenue.

The company said the hit against profits was the result of a vigorous inventory-reduction program, which depressed margins, and unexpectedly high manufacturing costs. In addition, a decline in orders from U.S. commercial businesses, competitive pricing pressures and the recently lifted suspension of its defense business all took their toll.

According to Michael Geran, an analyst at Nikko Securities Co., revenue patterns indicate that Unisys still has a grip on market share. But "the proliferation of product lines that emanated from the merger show up in the margins and make it tougher for the company to compete," Geran said.

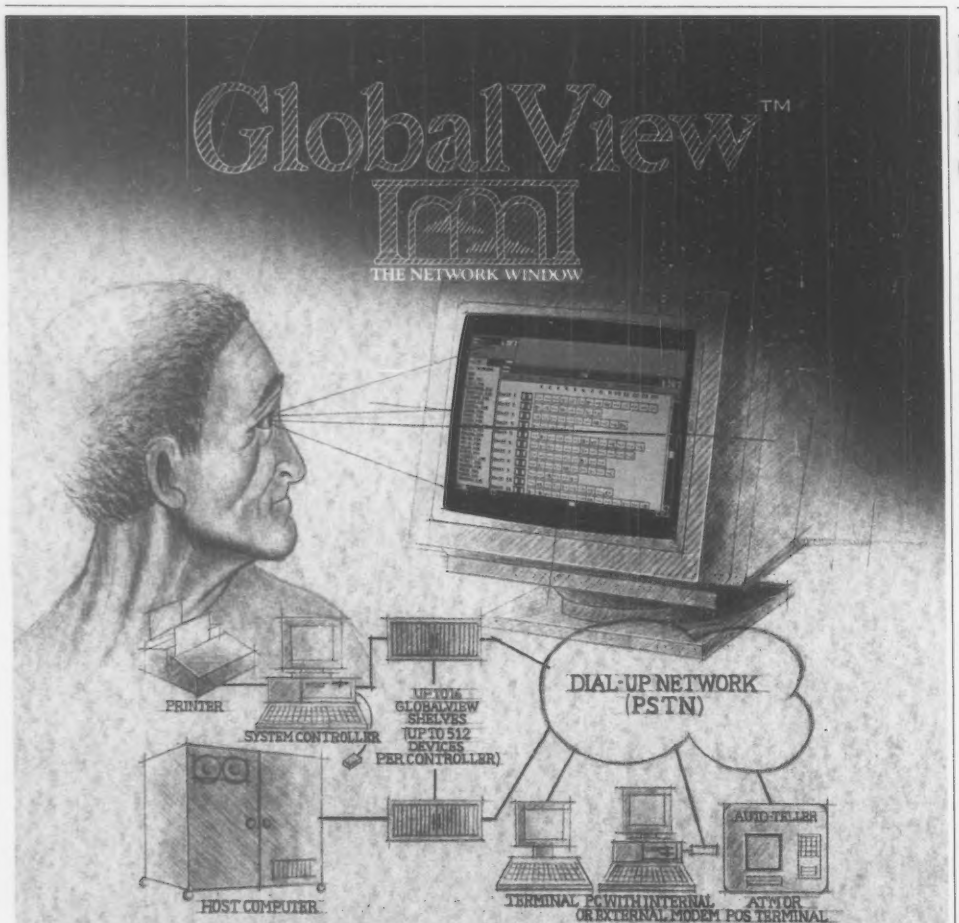
Gene Roman, president of Systems Design, Inc. in South Holland, Ill., and president of the Cube user group in Detroit, said that as a user, the earnings "don't make me feel very good, but as a stockholder, they make me feel worse."

Roman did not view the poor profits as a fundamental weakness in the company but said, "Unisys has to get its sales force in line because it has focused on user upgrades and going after its main accounts."

Like Roman, James Ault, director of information services at Creighton University in Omaha and president of Use, Inc., the Unisys 1100 and 2200 user association based in Bladensburg, Md., said that he was concerned about the company's strength but that it appears to be on schedule in its return to credibility.

"If something happens to Unisys, I and a thousand other 1100 sites are in big trouble," Roman said. "Unisys needs to reduce inventories, meet delivery dates and needs to ship every 2200 they can put together."

Midwest correspondent Ellis Booker contributed to this report.



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EDS to pack power in RISC database unit

BY J. A. SAVAGE
CW STAFF

Claiming there is no adequate front-end database machine powerful enough on the market today, Electronic Data Systems Corp. will build its own eight-processor reduced instruction set computing (RISC) product to run at 112 million instructions per second (MIPS).

EDS chose the Clipper C300 RISC architecture, which was originally offered by Fairchild Semiconductor Corp. in 1986 but was sold along with the Clipper division in 1987 to Intergraph Corp. in Huntsville, Ala. While other RISC architectures have gained market recognition and support from multiple vendors in the meantime, Clipper has been available in the U.S. solely through Intergraph.

The new machine is a joint project between EDS and Intergraph and will be the first multiprocessor implementation of the Clipper chip.

EDS is building its own machine because, according to an EDS spokesman, "It's really something we haven't been able to find in the marketplace."

Teradata Corp. in Los Angeles offers a non-RISC database front end based on Intel Corp.'s 80286 and 80386 processors. EDS has used Teradata machines but found that they lack the power that EDS needs, according to the spokesman.

An eight-processor Teradata system runs at 24 MIPS, the company said, and can be expanded to 1,024 processors for more than 3K MIPS. The EDS machine, according to Intergraph, will be boosted later to 256 processors.

In the noisy RISC marketplace, Sun Microsystems, Inc. in Mountain View, Calif., and Mips Computer Systems, Inc. in Sunnyvale, Calif., are considered the leaders in getting their architectures into general use by other chip manufacturers. Clipper may actually have shipped more than anyone else, according to Andrew Allison, editor of the "RISC Management Newsletter" in Los Altos, Calif., but those chips have all been sold through one company — Intergraph. Intel in Santa Clara, Calif., and Motorola, Inc. in Schaumburg, Ill., also have RISC chips available.

EDS did not announce a price or general availability date.

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High-tech's blaze of glory

Computer use in fire fighting helps keep the home fires from burning

BY MARYFRAN JOHNSON
CW STAFF

SAN DIEGO — As Bill O'Connor was busy tracking the laborious demobilization of more than 1,000 people who helped fight a 4,700-acre fire earlier this month, there was one piece of hardware he sorely missed.

"We should've had a computer up there," sighed the battalion chief of the San Diego Ranger Unit of the California Forestry Department (CFD). "It would be a bit more organized and cleaner if I had immediate contact."

Computer technology has reshaped the organizational landscape of fire fighting in recent years, enabling a flow of fresh information between headquarters offices and the fire camps.

Subduing nightmares

"When you've got 30,000 acres burning, and you're moving people and equipment in and out, it's a nightmare to keep track of all that on paper," O'Connor said. "Computers have made that easy."

But the proliferation of high-tech tools has also tangled up the lines of communication.

As various government agencies enter the fire fighting picture — each with its own computing environment — the result is often a mishmash of partly incompatible systems. That difficulty has led to an unusual alliance of federal and state agencies in an attempt to create a fully networked system for managing the myriad resources required to fight a major fire.

"This kind of cooperation is probably without precedent for major federal, state and local agencies," said Kenton Clark, director of aviation and fire management for the U.S. Forest Service (USFS) Pacific Southwest region.

Mixed company

The USFS, federal Bureau of Land Management, California Forestry Department and several California counties have joined in a cooperative venture to link existing microwave satellites, develop compatible software and bring in hardware that can "talk" to different government agencies during massive fire fighting operations.

The need is particularly pressing in California, where the CFD relies on a system built around 1,300 microcomputers, while federal fire officials use a mainframe-based system of "intelligent workstations" and fewer than 100 micros to cover 18 national forests in the West.

Uncle Sam takes direct responsibility for only 20 million of the 200 million acres of parks and forest lands in California. "Obviously, we can't manage it independently," said Clark, the USFS fire management director. "A fire doesn't respect jurisdictional boundaries."

"The hardware is obviously there. What is lacking is software development," said Bob Solari, group leader of fire planning and systems management at the USFS in San Francisco. "You can have all the applications in the world, but absent the interface, you can't talk to one another."

WIDE WORLD

Fire specialist *checks out a California blaze*

Funding for the project — which is at least three years from completion — comes from a variety of state and federal initiatives, with steering committees and advisory boards abounding.

"It's one helluva challenge," Clark said, laughing. "We're in an interesting dilemma, too. We want to be compatible with the state of California, but we also have to maintain compatibility with the rest of nation."

In the Pacific Northwest, for example, fire fighting organizations connect through Northwest Net.

That alliance of computer systems includes several federal agencies — the USFS, Bureau of Land Management, Bureau of Indian Affairs, National Park Service and Fish and Wildlife Service — along with the State Division of Forestry in Oregon and Washington State's Department of Natural Resources.

The agencies interconnect through Telenet Communications Corp.'s Telemail, using X.400 conversion for its message-handling system.

In California, as in other states, government agencies use their micros to access National Weather Service data through a public data network called Telenet.

"Our networks do talk to the federal system," said Bill Hookano, chief of management and systems planning at the California Forestry Department. "We can tap into Telenet and talk to the Data General machine."

The core of the USFS system is a $125 million national network of more than 860 Data General Corp. MV minicomputers linking nine regions and about 700 district offices.

"What we have is a distributed processing system supporting all our offices," said Clyde Shumway, USFS director of computer sciences and telecommunications in Washington, D.C. "We are clearly going to be putting a lot more computers in the field, both micros and DG minis."

Yet growing needs in information management and networking are confronting many state and local agencies with micro-based systems, he added. "The micros are fine for some support, but a large fire operation is like running a large business. You need to share information."

The crucial elements in fire fighting on a grand scale are dispatching people and equipment and organizing the ordering and inventory systems.

"We put terminals and printers right there in the fire camp, which could be a hotel or a field in the middle of the boonies somewhere," said Tim Quinn, a data communications specialist at the USFS in Portland, Ore. "We have to assume everything can fail. We have high temperatures to deal with, and the worst is the dust. It's incredibly dirty at the camps."

The USFS office in Portland maintains and distributes the fire fighters' data communications kits, known as "Dacks." The standard Dack will consist of two NEC Corp. 9630 modems, two Tellabs, Inc. 330A multiplexers, miscellaneous wiring, an Epson America, Inc. printer and even a package of baby wipes to clean the screens.

Shelf life

"All of the communication support for fire fighting comes right off the shelf," Quinn said. "Often, we need to replace something right away, so we don't do customized [purchasing]."

Attempts to tailor packaged software to fire fighting needs have failed thus far, according to Solari.

Federal forest service programmers, however, created a successful in-house application called Incident Resource Status System (IRSS), which helps keep track of people on the scene. Another new application written by a USFS officer in Missoula, Mont., creates an on-line resource-ordering system.

What has faltered thus far is the coordination of a federal/state shared database inventory of all available fire engines, air tankers, helicopters and personnel.

"We are two or three years away, but it's evolving fairly nicely," Shumway said.

PCs pay off for Forestry Department

BY MARYFRAN JOHNSON
CW STAFF

SACRAMENTO, Calif. — Bill Hookano remembers with some glee the reaction folks had to the California Forestry Department's 1982 decision to base its statewide emergency fire dispatching on personal computers.

"People literally laughed at us," said the CFD chief of management and systems planning.

No one is laughing today.

"We've shown that it works," Hookano said. "There's been so much interest in our project because there is no big machine, no major node anywhere. It's all little boxes."

While struggling with severe budget shortfalls in the early '80s, state officials acknowledged the need to automate California's fire-fighting system.

"We have more and more fires, more to protect, and here we are trying to deal with this exploding work load and no money," Hookano said.

That dilemma led to the micro-based demonstration project, funded by the forestry department.

"Instead of paying $5 million for a location, it's more like $50,000," Hookano said. Now, there are at least 1,300 IBM-compatible PCs spanning the state and another computer networking project under way to increase access between state and federal computer systems.

With an information systems budget of about $1 million, the CFD has the smallest percentage of high-tech spending among state agencies.

"In all the other state departments, the data processing organization is approximately 5% of the budget," Hookano said. "At the department of forestry, it's less than 1%."

So far this year, there have been 3,867 fires in California, most of them involving both wild lands and residential areas with a total acreage of 40,319. Last year, there were 5,637 fires over 32,666 acres.

"We are the most fire-prone place on earth, excepting the southern coast of Australia," said Karen Terrill, an information officer at the CFD — the largest fire department in the nation.

Mobilizing to fight a fire covering thousands of acres means bringing in an army of local volunteers and military personnel, hundreds of pieces of gear and aircraft from all over the U.S.

"The machines help primarily in keeping track of what's there," Hookano explained. "It tells us stuff like: Who the hell's fire engine is that? And where did we put it?"

The two types of data most urgently needed are weather conditions — wind direction, temperature, moisture readings and location of lightning strikes — and availability of equipment and people.

"Usually, the biggest problem is getting [computer] equipment to the location, which is off in the middle of the forest somewhere," said Ron Brauer, IS manager at the CFD.

When Brauer was on the scene of a large fire near Mendocino, Calif., two years ago, the computers were sheltered in a tent under the trees, humming away beneath the din of passing water trucks spraying the dust.

The micros are dedicated to various uses at the base camps. While one may be tracking accounting costs, another is used to check in new arrivals. A third may be busy compiling such fire statistics as number of engines, helicopters, hand crews and air tankers required.

"Everybody's starting to realize that the coming thing for future [emergency operations] is to tie everything to the computer, rather than handwrite it all later," said Bill O'Connor, battalion chief of the San Diego Ranger Unit of the CFD.

"Computers have just made us better at fighting fires," Hookano said. "It's hard to know how much of the state would have burned down without them."

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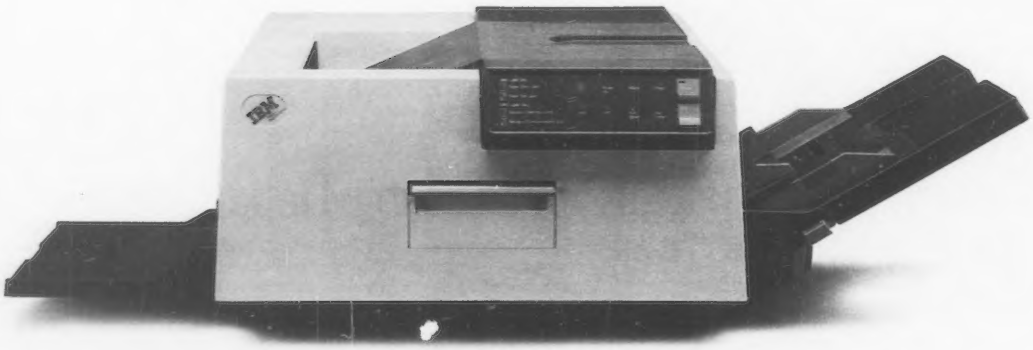

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EDITORIAL

Prime time

THE SAGA OF the attempted takeover of Prime Computer has followed a script that has gone from *Peyton Place* to *The Rocky Horror Picture Show.*

Prime's shareholders are shocked by the events, employees are frustrated and frightened, while customers no doubt are questioning just what sort of company they are dealing with.

Last week, Prime's board earned an Emmy nomination in the category of "leadership sleight of hand" when, at the 11th hour, the board postponed the company's annual meeting 90 minutes before it was slated to start.

Although there was no official meeting held, Prime's board did take the opportunity to drone on for more than an hour with its shareholders, exhorting them to back management's choice of a buyout partner, a venture capital firm.

Meanwhile, that same venture capital company, J. H. Whitney, was readying a press release of its own that said its main financial backers, two big banks, are growing increasingly skeptical about backing the Prime purchase, given the company's recent performance in the market.

And then there's MAI Basic Four, which is offering $600 million for Prime's minicomputer business, leaving the computer-aided design and manufacturing operations bought from Computervision on the table. Of the $600 million offer, $450 million is in cash and the rest in MAI's own currency, otherwise known as debentures.

The shareholders were supposed to have chosen between these two offers at the meeting. At press time, Whitney's offer was set to expire before the meeting's new date of Aug. 9.

Without question, the biggest losers in this charade to this point are Prime's customers. Generally speaking, they are bewildered by the events at Prime and are reacting by maintaining the status quo. They are not doing more buying than they have to, as evidenced by the company's financial results, which were released last week. The hard-core Prime devotees still swear by the efficiency and reliability of its minicomputer solutions.

Others contacted feel they are in a lose-lose situation and are looking to jump ship. They feel generally that MAI is on a buy-dismantle-and-run mission, and to hell with the customer base. If Prime can fend off MAI, the costs of doing so could come at the expense of support, product development or general integrity.

If management is truly acting in the long-term fiduciary interest of shareholders, as it is charged to do, it will act swiftly to calm the waters of its customer base; without that base, there is no company. Dilly-dallying with protracted delays and impromptu hucksterism is anything but responsible. After all, it's not as if there aren't a few minicomputer companies out there in need of some new customers.

LETTERS TO THE EDITOR

From the Far East

Regarding your Viewpoint article, "Keep high-tech link to China" [CW, July 10], China needs high-tech to modernize herself; in turn, the modernized China will be more democratic.

In this letter, I want to correct the reports that say the Chinese government is now taking the step to station soldiers next to every facsimile machine to monitor transmissions. The fact is that I sent this letter by fax without any soldier standing by me. I have contacted some friends, and their fax machines are not monitored by soldiers, either.

The situation in Beijing has returned to normal. More news releases are being sent to us by foreign computer firms from their Beijing offices.

Tang Baoxing
Deputy General Manager
China Computerworld

Wake-up call

I want to congratulate you for your thought-provoking editorial, "Zzzzz. . ." [CW, July 10].

It is indeed sorrowful to see this great nation, which managed to put a man on the moon, fall behind on several critical fronts, most notably the economic and technological ones. It is quite obvious that the U.S. has been rather lethargic for the past several years while others have been busy trying to catch up. This country cannot afford to rest any longer on the economic, technological and military laurels of the past.

The computer industry is already reflecting the trend of our times: Mainframes are giving way to networked minis and micros; centralized and monolithic operations are being downsized in favor of distributed, more cost-effective and responsive ones.

The information "wars" of today are not fought so much on the data center floors by MIS alone; instead, they are increasingly fought and won on the desks of all those "unknown soldiers" (PC users) who, after all, know their business needs better than anybody else.

To regain the worldwide leadership role it once had, the U.S. has to return to its exploratory, invigorating and entrepreneurial spirit. Constant research and innovation are needed to improve the way we do things. Corporations and individuals must do their share, too, by looking for long-lasting solutions while avoiding the "quick-buck" mentality.

The U.S. has a unique international role to play and so it must wake up and soon. Such a global responsibility cannot be left to chance.

Dr. Gus A. Galatianos
President
Advanced Computer Consulting International
Whitestone, N.Y.

Still kicking

Contrary to your headline "Avant-Garde gives up the ghost" [CW, July 3], we are still very much alive.

Far from giving up, Avant-Garde will neither fade from the marketplace nor be submerged within Boole & Babbage, Inc. Instead, it will be strengthened, and its customers will continue to benefit from its solutions to monitoring and management needs, Net/Alert Plus and Net/Command 2.0, which is being delivered on time despite the company's distractions.

As a division of Boole & Babbage, Avant-Garde will be managed by a team of current Avant-Garde senior executives, including its current sales force led by Avant-Garde co-founder Morgan Lamarche. Continuity of customer support, product lines and philosophyis ensured. I will be president of the Avant-Garde division, having spent five years establishing and expanding our overseas operations.

Given Avant-Garde's litigious history and the potential magnitude of the contingent liabilities relating to this litigation, the only sure way of conveying clear title to its operating assets is for those assets to pass through the bankruptcy court in a Chapter 11 reorganization.

This will also enable Avant-Garde to continue to service its customers pending completion of the Boole & Babbage transaction. It is anticipated that Avant-Garde will commence operations as a Boole & Babbage company within 90 to 120 days.

Boole & Babbage is the partner for Avant-Garde that makes sense, the partner we have been seeking for some time. Avant-Garde as a Boole company will bring renewed vigor and fresh perspective to the marketplace as it continues to work with its customers to provide realistic solutions to their needs.

Bill Ahlstrom
Avant-Garde Computing, Inc.
Mt. Laurel, N.J.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Holy systems! It's a batvirus!

GLENN RIFKIN

Bruce Wayne is seated at a vast multiscreened console in his stately mansion. Columns of figures appear on the various screens, moving and changing rapidly as Wayne's fingers fly across the keyboard. Silently, Alfred the butler approaches.

"Sir," Alfred intones.

Wayne screams, pitching forward onto the keyboard and sending the columns and numbers into a scrambled mess.

"Jeez, Alfred, how many times have I asked you not to sneak up on me like that?" Wayne demands. "I'd just gotten Release 3 of 1-2-3 up and running, and now it'll take me another month to figure it out."

"So sorry, sir, but there's a young lady here to see you. She has a reporter with her, I'm afraid. They want to ask you some questions about this 'Batman' person who is reportedly flying around Gotham City."

"Well, get rid of them, Alfred. I'm trying to figure out how to save Gotham City from the dastardly Joker, solve the mysterious murder of my parents and project the interest on a CD I opened today."

"All right, sir, but the lady looks a lot like Kim Basinger."

"Hey, ho there, Alfred, a short break couldn't hurt now, could it? Show her in."

Moments later, Alfred returns followed by a stunning blonde and a young, determined-looking reporter. The pair is looking around intently at the dark, sinister setting.

"It's like a cave in here," the reporter says with a chill.

"What do you expect? This is the data center," Wayne responds. He turns and looks deeply into the eyes of the blonde. "And what can I do for you?" he says with practiced charm.

"Well," she replies, eyeing the keyboard and countless software packages stacked up on the computer console, "I'd heard that Bruce Wayne was a sophisticated, somewhat mysterious but devastatingly handsome (and also unbelievably wealthy) man. I didn't know he was also a geek. Nice to meet you. I'm Vicki Vale. And I believe you can help me find Batman."

"Why do you believe that?"

"Call it a wild hunch, call it woman's intuition, call it the fact that the Batmobile is double-parked out front," Vicki says.

Wayne whirls on his butler. "Alfred, I told you to pull the car into the Batcave!"

"So sorry, Mr. Wayne. I was going to, but we were out of milk, so I thought I'd take a quick spin to the 7-Eleven. Then the phone rang and the cat got out and . . ."

"OK, OK." Wayne turns to Vicki. "I'm Batman."

The young reporter hoots. "Ha, right, you're Batman. Hooo, that's rich. You look more like Mr. Mom. What a laugh."

Vicki wheels and yells. "Shut up, you jerk. Don't you know what they can do with movie makeup?"

Suddenly, one of the system screens lights up and the bizarre, smiling face of the Joker appears. He starts laughing maniacally.

"Wait'll they get a load of this virus," he screams. "Listen, Batman, wherever you are. I've decided to give up torturing Gotham City. I'm negotiating some mergers and acquisitions instead. You're gonna love it. I'm merging *Batman* with *Ghostbusters II*, and we're doing a leveraged buyout of *Star Trek* and *Indiana Jones* and *The Last Crusade*. The Big Four will become the Big One . . . with me as CEO. I haven't had this much fun since the Lakers beat the Celtics in '87."

"Holy disaster recovery," Wayne mutters. He suddenly slips away, then returns in full Batman regalia. "I've got to stop that dastardly villain."

Batman races to the keyboard of his console. "You've *got* to stop him, Batman," Vicki screams. "I can't possibly share top billing with Sigourney Weaver."

On the bank of screens, the evil Joker appears, surrounded by his new partners. Bill Murray leans over and nudges the Joker in the ribs. "Hey, babe, who you gonna call?" On a second screen, Admiral Kirk and Mr. Spock stop and turn to the camera.

"Excuse me, Admiral, the computer tells me that we are the object of a hostile takeover," Spock says.

"What? That's not in the script," Kirk bellows. "What . . . can . . . this . . . possibly . . . mean?"

Suddenly, Indiana Jones gallops onto the bridge of the *Enterprise*, where his horse stops short and tosses Indy onto Kirk's lap. "Whoaaa, hey, what's going on here?" he cries.

"Get . . . off . . . me," Kirk says, pushing Indy onto the floor.

"The evil Joker has merged with 'Ghostbusters' and is initiating a hostile takeover," Spock explains. "It isn't entirely illogical. Joint receipts could top $1 billion."

"You unfeeling, pointy-eared capitalist," yells Dr. McCoy, who has just arrived on the bridge. "What about art? What about culture? What about the next 14 sequels?"

From his keyboard, Batman cuts off the hubbub. He hits a button and the screens go blank. He turns to Vicki.

"I'll tell ya, this business just ain't what it used to be. I'm turning in my cape."

"But Batman, who'll stop the Joker?" Vicki wails.

"Heck if I know. He's already under SEC investigation. I've got a great job offer at Microsoft with my old sidekick, the Boy Wonder."

The young reporter's eyes open wide. "Robin was Bill Gates?"

"You got it, sport," Batman says as he heads to the door. "And they used to call me Adam Osborne."

CHRIS DEMAREST

Rifkin is a *Computerworld* features editor.

Can you manage quality into a software product?

ROBERT GLASS

Is software quality a management or technical topic? A lot of people see it as the former. If you read a book or take a course on software quality, there is a tacit assumption that right after the word "quality," the word "assurance" will be found. Couched that way, quality definitely becomes a management topic.

But the fundamental problem in software quality is technical, not managerial, and I would like to decouple the word "quality" from the word "assurance."

This technology-first approach requires an explanation.

First of all, what I *don't* mean by quality is one of the popular definitions today, which says, "Quality is a matter of satisfying the product's requirements." If you go by that definition, and the requirements include price, then a Yugo is a higher quality car than a Rolls-Royce.

No, to me, quality is something more complicated. I like the definition that quality is a set of attributes that a product should have. For software, the set includes reliability, efficiency, understandability, modifiability, testability, portability and human engineering. If software is built with these attributes, it is simply quality software.

No matter how carefully management plans and provides for quality processes in software development, it is no more possible to *manage* quality than to *test* it into a software product.

It is well accepted that quality cannot be tested into software, because testing only looks at reliability, one facet of quality, and because testing comes too late in the life cycle to have a preventive effect on poor quality. It is not commonly accepted that quality cannot be managed in. In fact, that is a radical viewpoint.

No easy answers

You can't *manage* in quality because quality is a deeply intimate software trait. The injection of quality and the detection of quality occur far below the surface of software's facade. How can you put understandability and modifiability into a software product? How can you find out if they were put there? There are no easy answers to these questions, but the fact is that only a technical person can do the putting and the finding.

Management, for better or worse, is, in this sense, only a casual viewer of the software product. Understandability and modifiability are so deeply technical that they are simply not assessable by the casual viewer.

That is not to say, of course, that management has no role in building quality software. To the contrary, there is an essential role for management to play. Management must construct and maintain a climate in which quality is fostered and nurtured.

A quality climate is one in which processes that facilitate quality are enabled and followed; tools to assist in providing quality are procured and used; people who think quality are hired and helped; and advocacy of product quality occurs right up there with advocacy of schedule and cost-constraint conformance.

It is easier to say these things than to do them. We are passing through an era in which schedule and cost have been the dominant factors in evaluating software management and software products. There are some good reasons for that. Software's schedule and cost performance have often been abysmal. With rampant problems in this area, management has rightfully concentrated on trying to solve these problems.

But there is a danger here. As the pressure of meeting schedule and reducing cost intensifies, it is quality that inevitably suffers. How can we accelerate a late product? We cut back on whatever is happening when the problem is discovered, usually verification and testing. The result: reduced product quality.

The software manager of the 21st century must find a new equation for software. It must not simply be the equation software product = on schedule + within budget. It must instead be software product = quality + on schedule + within budget. Achieving good results in that more complicated equation requires management commitment to quality as an end goal.

It is not hard for management to facilitate the construction of quality software. Most technical people fundamentally want to do a good, quality job.

Quality assurance is important, but it is only one avenue to software quality. And sometimes, when we focus too hard on quality assurance, we obscure our ability to achieve the quality product that we really want.

Glass is president of Computing Trends, a software engineering education and consulting company based in State College, Pa.

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HARD TALK

Rosemary Hamilton

BBN knows its limits

It's refreshing to talk to a computer salesman who knows his limitations.

Take David Micciche, vice-president of marketing and sales at BBN Advanced Computers, a division of Bolt Beranek and Newman. Earlier this month, the company introduced a new minisupercomputer that can be expanded to a supercomputer-class machine. When Micciche was asked how the company would have done if it decided to sell direct to commercial users, he said, "I think we would have been very unsuccessful."

BBN seems to have a good grasp on where it stands in the commercial business. It has a long way to go before information systems managers can seriously consider it. Other vendors that promote so-called hot

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- Mini center keeps Cincinnati Zoo swinging. Page 25.
- Disaster recovery center loves New York. Page 28.
- Index upgrades Excelerator. Page 29.

COOPERATIVE PROCESSING

IS takes its first steps into new land

BY DAVID GABEL
SPECIAL TO CW

Information systems managers discussing cooperative processing can be likened to the three blind men who described an elephant after respectively feeling its trunk, leg and tail. Cooperative processing means different things to different people.

Some IS professionals who have developed cooperative processing to varying degrees, however, agree that the efforts have delivered payoffs at little cost and that the technology is poised to grow.

In a nutshell, cooperative processing refers to a system in which two or more computers, typically a host and workstations, share the processing of an application, with each handling the functions it does best while addressing the same database and communicating at the application level.

Sovran Financial Corp. in Norfolk, Va., has produced a demonstration system for senior managers that applies cooperative processing to a customer service application and is developing an IS Help system that employs cooperative processing, which it expects to have in use by the end of the year.

TOM MONAHAN

Sovran uses a fourth-generation language, or 4GL, development tool for the work called Nomad PC from Must Software International, Inc. Nomad PC is the only 4GL on which Sovran has standardized that provides cooperative processing capabilities, said Charlie Kirkpatrick, a systems analyst there. The company has not looked at competing products.

"The whole concept is to offload work from the mainframe," Kirkpatrick said. Because CPU cycles are cheaper on the personal computer, the aim is to offload any work that the PC can handle as well as or better than the mainframe.

For the IS hot line, Sovran is offloading the user interface, all Help functions for the system, error messages and static lookup tables, as well as other code for data validation and lookup.

"Here, you have a transparent dialogue going on between the PC and the host," Kirkpatrick said. "End users should be

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Small firms flock to fill AS/400 tape-drive gap

BY ROSEMARY HAMILTON
CW STAFF

FRAMINGHAM, Mass. — Acknowledge, Inc. last week became the latest small company to close in on IBM's weakness with the Application System/400 tape drive.

The company introduced a line of nine-track tape subsystems that it claims offers between 1.6 and 2.6 times the performance of IBM's current tape drive offering, the 2440.

Acknowledge and a handful of other companies are trying to capitalize on the bad reviews the 2440 has received from high-end AS/400 users.

Opportunity closing

Their window of opportunity may soon be closing, however. While IBM has long acknowledged that the 2440 was not fast enough to meet high-end users' needs, it apparently had no adequate follow-up for it — until last month. In June, IBM announced that it would greatly boost the 2440's performance sometime this quarter.

Nonetheless, Acknowledge and the other suppliers think they can still win some business from dissatisfied AS/400 users.

This new third-party market includes Universal Computer Systems, Inc., which began shipping a cartridge-based 2440 alternative last month, and Cipher Data Products, Inc., which is reportedly planning to officially announce a cartridge-based tape drive next month.

Data rate called slow

The main problem with the 2440 is its data transfer rates — 120K byte/sec. and 469K byte/sec. Users have maintained that those transmission rates are absurdly slow.

Acknowledge said its tape product line offers an average maximum data transfer rate of 781K byte/sec. A high-end model has a peak transfer rate of 1.25M byte/sec., which would be 2.6 times the performance of a 2440.

The company will sell its systems at prices ranging from $24,500 to $62,000. IBM's 2440 sells for $28,350.

However, within a few months, IBM will begin shipping an improved 2440 that will be less of an easy target for third-party vendors like Acknowledge. The 2440 will offer transfer rates of 235K byte/sec. and 918K byte/sec.

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SOFT TALK

Martin Goetz

IBM/DEC: Bundles of pain?

Twenty years ago, the unbundling of IBM software was considered to be a major victory for information systems users worldwide. It meant that they would all save money, expand their software choices to systems offered by independent vendors and free themselves from IBM's harsh dictates.

Now, the concept of software bundling is suddenly rearing its ugly head again, beauty being in the eye of the beholder. A recent bundling announcement by DEC is being billed as offering "significant benefits to our customers . . . that will benefit independent software vendors." Will it really? You be the judge. Here are the facts:

During the past six months, DEC has bundled its RDB runtime relational database product and its communications product with its VMS and the MS-DOS operating systems. Until then, these products had been separately priced and separately licensed.

This move by DEC is almost identical to IBM's 1987 bundling of its relational Database Manager and its Communications Manager with the Standard Edition of OS/2 to form OS/2 Extended Edition.

Continued on page 29

It can talk for the animals

Minicomputer no snake in the grass when it comes to zoo fund-raising

ON SITE

BY RICHARD PASTORE
CW STAFF

CINCINNATI — If you can tear yourself away from the lowland gorillas' family get-together and take your eyes off the basking white bengal tiger, you will eventually come to a building of hand-hewn timber that houses the Cincinnati Zoo's minicomputer system. Though no crowd-pleaser in itself, the system's support of fund-raising efforts helps vitalize one of the most highly acclaimed U.S. zoos.

Public donations are integral to the care of the zoo's 780 animal and 1,200 plant species and to the support of its internationally recognized, innovative Center for the Reproduction of Endangered Wildlife. Donations account for more than one-fourth of the zoo's funding.

Justifiably, the zoo's new Prime Computer, Inc. 4050 will be chiefly devoted to fund-raising. The Prime system is expected to fully replace the current Wang Laboratories, Inc. 2200 by October. The zoo's financial applications will continue to be handled by a third party.

Changing its stripes

Last summer, the zoo's computer operations department upgraded its commercial fund-raising software to keep track of its 100,000 donor records and 300,000 annual payments more accurately. But the upgrade shoved the department up against the Wang system's ceiling.

"We ran slower than we used to. The simplest thing would take a minute to do," said Raymond Ulrich, computer operations manager. Cost analyses showed that the best bet was to trade it all in. Ulrich then set out to find a new commercial fund-raising package that would better fit the zoo's needs.

Specifically, the software had to accommodate the zoo's Adopt program, in which donors can choose to support a specific animal such as a red panda and, in effect, become its foster parents. The zoo, in turn, sends the donor a photograph and fact sheet of the panda as well as bonuses such as Christmas ornaments.

Fund-raising *efforts support surrogate breeding for endangered species*

Corresponding with donors about their adopted animals has been a problem for the zoo. "Right now, it's really hard because it's all done by hand. We track them on our computer, but we don't have the time to print fancy letters or anything," Ulrich said. "If the animal dies, we want to be able to let the person that adopted it know that we're transferring the funds to another animal." The zoo needed a package that could generate such letters automatically.

"That was the hardest thing," Ulrich said, "finding a package that could handle those kind of premiums." Ulrich finally chose Benefactor from Datatel Minicomputer Corp. Because it runs only on Prime boxes, "the software dictated what machine we would buy," he said.

At the time, Prime was waging a costly takeover battle with MAI Basic Four, Inc. Ulrich, who was worried, "talked to Prime and decided that it was not going to be affected as far as our interests are concerned," he said. "I believe Datatel has enough interest and influence at Prime so that we don't have to worry."

Ulrich is more interested in the Prime box's power. "It will move three to four times as fast as what we have now," he said. Its 1G byte of storage — double the Wang system's — should be adequate for five years.

The zoo's development and marketing staff will benefit most from the power boost. The faster system makes it practical "to merge and purge donor lists, eliminating duplicates so we don't contact people twice," said Maryhelen Bauer, the zoo's donor prospect manager.

The marketing staff uses the increased ability to track donor's special interests — research, botany or education — and targets promotions accordingly.

With the Wang system, "we have to run from the phones over to the one central terminal, and that's not good when you have a donor waiting on the line," Bauer said. Now, development and marketing staff will have access to 16 Wyse Technology dumb terminals connected to the minicomputer.

With so many more distributed terminals, Ulrich and his staff of three full-time entry people face a security challenge: Donor histories are considered sensitive data. "They're going to get their own terminals, but they're not going to get the freedom," Ulrich said. "They will only be allowed access to screens that pertain to their interests. And nothing will get printed unless it passes through my desk."

The frustrating reality

Ulrich is less self-assured when discussing his control over the zoo's 15 or so distributed stand-alone personal computer systems. "All the buying of computer equipment is supposed to go through me," he said, but the reality of a fragmented structure spread out across 67 park acres and a do-it-yourself attitude frustrates this ideal.

The computer-sophisticated business office managers, for instance, prefer to look after their own PC applications. These include tracking admissions by ZIP code and logging equipment purchases by serial number.

Breeding-hospital staff will autonomously run an inventory package — which Ulrich is now shopping for — that keeps tabs on the menagerie. The program, which replaces a manual card file, will coordinate breeding efforts between individual animals.

However, as autonomous as it will be, when the hospital's PC freezes, it will inevitably call on Ulrich. Then he will hop into one of the zoo's golf carts, make a sharp right at Gibbon Island and head toward the facility tucked behind Big Cat Canyon.

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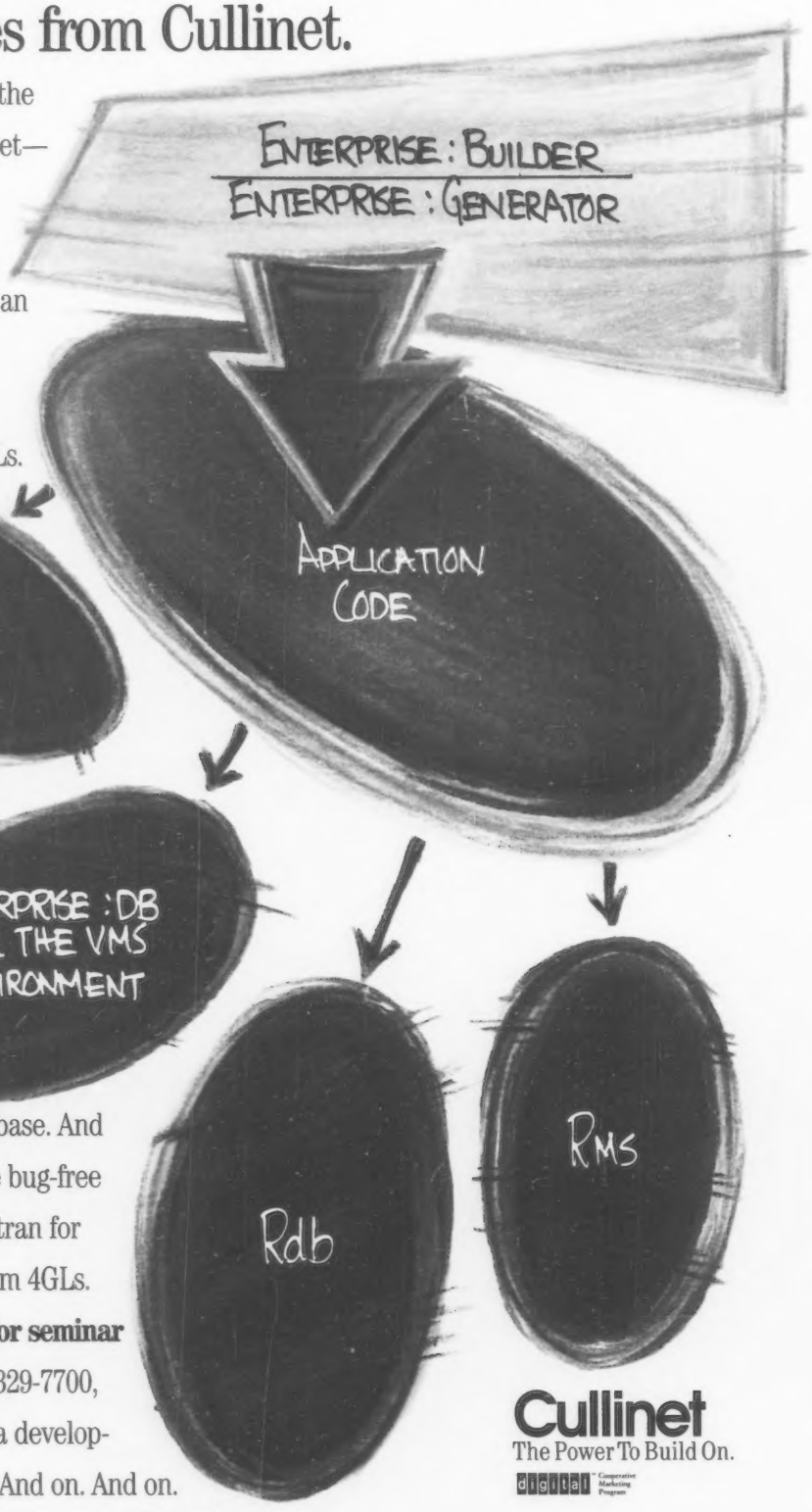

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IS differs

CONTINUED FROM PAGE 23

able to sit down and hit a button on the PC and the data he wants to look at appears in a readable format. He doesn't know where it's coming from, and he doesn't care."

In addition to cutting processing costs, the PC delivers capabilities that the mainframe does not offer, such as the "aesthetics" of an IBM Video Graphics Array color display, Kirkpatrick said: "You get the best of both worlds."

The PCs can also drive printers, so if Kirkpatrick wants to add one to the system, IS staffers do not have to run a cable and define it for the mainframe.

Kirkpatrick said the biggest hurdle he has encountered is the need for thorough error checking, because errors must be conveyed from the mainframe to the PC. "You have to trap errors on the mainframe and transmit them to the PC," he explained. "You have to be able to interpret mainframe errors on the PC."

Life of Georgia, a life insurance company in Atlanta, turned to cooperative processing to modify a mainframe claims application whose code for screen displays could not be altered because of its licensing terms. Life of Georgia wanted to modify a package for processing group policy claims so it could use the package to process individual claims. One necessary change was to add to records a Medicare control number that helps ensure that claims are not paid more than once.

The license for the mainframe package allowed addition of a subroutine to process the control numbers but not modification of the displays so the numbers could be entered. Life of Georgia substituted PCs for dumb terminals and linked them to the mainframe with Mozart from Aspen Research, Inc. — a product previously known as Enter 3270. Mozart intercepts and modifies IBM CICS information from the mainframe application after it enters a PC but before it is displayed, thereby providing a display that accommodates the Medicare control number. It then reformats the information for the mainframe.

"With the PC, we can edit, issue warning messages and do calculations," said Walter Tate, a systems analyst at Life of Georgia. "Once they're filled in and get by warning messages, the screens are sent to the mainframe by CICS and update the mainframe files.

"Now, we have the modified application we need, without changing one line of vendor code. Rewriting [the application] ourselves would have taken years."

The PCs also provide claims processors with a more friendly workstation, Tate added. With them, the IS organization can automate users' log-on sequences, eliminate the need for them to enter repetitive data such as the current date and customize their screens.

Life of Georgia, which has not compared Mozart with alternative products, is looking at some other mainframe packages it uses that might benefit from modified displays. "We have several other packages that are very user-unfriendly," Tate said.

Sony Corporation of America in Park Ridge, N.J., has encountered technical and managerial stumbling blocks in developing cooperative processing systems, but Robert Trenchard, senior vice-president of MIS, said the technology is the wave of the future.

Across the board

With help from SQL, Information Builders, Inc. Focus and other products, Sony has employed cooperative processing in a variety of applications, including computer-aided software engineering, decision-support tools and systems for configuring complex products such as broadcast studio equipment. With a configuration system, users take orders on a PC, check them against information on the mainframe and then configure and price the orders using the mainframe.

"You're processing at different levels of your architecture," Trenchard said. "The PC is capturing, consolidating and concentrating, editing, validating and then transferring data to the mainframe."

Cooperative processing can cut the costs of running such systems, Trenchard said. Enabling PCs to handle the presentation work reduces communication between terminals and the host. That increases system throughput and response time, boosting the transactions that can be processed in a given period of time.

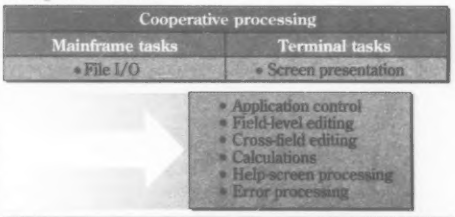
Among the obstacles Trenchard has encountered, however, is the inability of PCs and their communications links to handle the transaction volumes Sony requires from some of the systems. Improvements in those products and modifications made to them by Sony have partially relieved such bottlenecks, he said.

Of greater concern, however, have been people problems. Even though Sony's move to cooperative processing is driven by top management in Japan, Trenchard found that some user managers are reluctant to yield control over their PC systems by having them linked with mainframe applications.

In such situations, it is better to try to introduce cooperative processing by "negotiating from above," Trenchard said. "If you can't get cooperation from the people, then don't try to use cooperative processing. It will fail every time. A large part of being in data processing is being a salesman."

What it is

In cooperative processing, much of the host's load is shifted to intelligent workstations



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The nitty-gritty

Cooperative processing is a relatively new technology that has generated more than its share of confusion. Users and vendors alike even disagree on what cooperative processing is.

Some vendors claim that their file-transfer products deliver cooperative processing, while others contend that software that automates communications does the job. But cooperative processing is more: It is processing that is shared among two or more computers over a communications link, with each machine handling what it does best.

Cooperative processing typically involves offloading processing from a host to personal computers. There are a variety of reasons for doing this. First, PCs are more capable for some jobs, such as providing the user interface. Moving other tasks to the PC, such as data validation and editing, reduces the need for host-to-terminal communications.

The chief technologies for enabling cooperative processing in the IBM-compatible world are familiar: LU6.2, peer-to-peer communications and IBM Systems Application Architecture. But these protocols do not define cooperative processing. They establish conditions for cooperative processing to take place with IBM-compatible computers and software.

To understand cooperative processing requires understanding of the layered nature of data communications systems. By now, most people are familiar with the International Standards Organization (ISO) Open Systems Interconnect model and IBM's Systems Network Architecture. The lower and middle layers of the model contain the definitions that specify protocols for messages, establishing end-to-end communications and other essential tasks. At the highest layers of the ISO model — the presentation and application layers — information can be communicated without being presented to the user, and applications can use communicated information without themselves being part of the communication process. For example, a file-transfer application can take a large data file from a mainframe and load it into a microcomputer without the user ever seeing the data as it transfers.

In cooperative processing, communications is an integral part of the application. Several processors work on the parts of the application that they are best at handling — some doing number-crunching, some presentation, some data moving and lookup, some high-speed parallel operations, and so forth. Each processor communicates with the others at the highest level — the application level.

In fact, it is fair to say that the processors find communications is not their only application but just one task in their contributions to processing the entire job.

DAVID GABEL

Big Apple disaster recovery

BY ROBERT MORAN
CW STAFF

NEW YORK — Manhattanites have a reputation for snobbishly refusing to leave their island, except for vacation or under dire circumstances.

Alicomp, Inc., which opened a disaster recovery facility in downtown Manhattan last month, hopes that companies share that propensity when it comes to disaster recovery facilities.

Alicomp, a subsidiary of Amalgamated Life Insurance Co. in New York, claims that it is the only disaster recovery site in Manhattan and that it can spare companies the expense of lodging and travel when sending their employees outside of the city during a disaster.

To date, the company has subscribers both in and out of the city that use what Alicomp President Art Kurek calls "redundant offices." These offices are equipped with 153 workstations that include telephones, IBM and Digital Equipment Corp. terminals, facsimile machines and other related office equipment.

According to Kurek, the room can house more than 100 employees during a disaster. "We offer companies not only computer backup, but we house their employees in an environment conducive to working," Kurek said.

Those facilities are fed by an on-site computer room that houses an IBM Model 3081K mainframe, numerous disk and tape drives and telecommunications equipment. In addition, the company subcontracts with DEC, allowing employees to work within the Alicomp facilities and access DEC facilities in Parsippany, N.J., through telecommunications. Computer operators, however, must travel to DEC's hot site in Parsippany.

Trading post

Kurek said the company is also building a trading room, scheduled for completion in the early fourth quarter of this year, that will contain tools used for trading and international money transfer.

Prices range from $1,500 to $5,000 per month, depending on the amount of service to which a company subscribes. The fee includes both the right to access the facilities during an emergency and 36 hours of contiguous testing or three different 12-hour tests.

To avert exhausting capacity at the Alicomp facility, subscriptions to the services are limited to one company in any single building in Manhattan, Kurek said.

Because most of its clients do not require all of its resources, Kurek said that as many as four companies could probably work within the facility during a disaster. "Like our competition, we will only promise full resources to the first company that declares a disaster," Kurek said. "The rest will be subordinated to the first one."

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Hamilton

CONTINUED FROM PAGE 23

technologies without a marketing plan could learn from BBN.

But it also has some decent technology and some interesting plans. So it would make sense to keep a thought of BBN tucked in the back of your mind for the future.

The company has adopted a strategy that several other hardware companies now employ. It plans to team up with software vendors that have what BBN doesn't have — namely, commercial software and a reputation in the commercial market.

Without this approach, BBN's TC2000 won't show up in very many traditional IS shops. The company has made a name for itself in scientific and research circles and plans to go after those sales directly. In the meantime, though, it is working on deals with such companies as Oracle before it makes a big splash in mainstream computing.

That's a wise decision, because it seems that on its own, BBN's only bargaining chip would be raw processing numbers. Its TC2000 can be assembled into a giant of a machine that runs 504 processors. At that configuration, the system operates at 9.6K million instructions per second (MIPS) and supports 16.1G bytes of data.

Those are some numbers. But IS managers haven't cared much for big numbers alone for some time. In fact, that fully configured MIPS rating is so high that it almost seems absurd by today's standards. But in a few years?

The company is taking advantage of its parent company's communications division, which will enable it to network its TC2000 to large mainframe installations.

Combine that with a database management system such as a version of Oracle running on its high-speed system, and you could have a very powerful database machine. The current thinking is that today's mainframes will eventually be replaced with very high-performance dedicated processors. Given that, the TC2000 could eventually serve as a dedicated database processor in a large commercial environment.

Of course, this won't happen soon. Right now, BBN doesn't have all it takes to score big in the commercial arena. But if it can implement its partnership plans, it could have a shot down the road a piece.

Hamilton is *Computerworld's* senior editor, hardware.

Index gives boost to Excelerator

BY AMY CORTESE
CW STAFF

CAMBRIDGE, Mass. — Index Technology, Inc. recently released an improved version of its widely used Excelerator systems analysis and design tool.

Version 1.9 of Excelerator contains enhancements to the XL Dictionary, the core of the software, which stores and manages all the elements of a systems design specification from data structures to documentation.

Enhancements to the dictionary include support for new data relationships and a browse feature that lets developers view contents of the dictionary without using a menu.

New entity and relationship types such as user requirements, notes and change requests have been added to bolster project management and planning capabilities.

Report options

Additionally, Version 1.9 includes new report options, enhanced data flow diagrams supporting Yourdon modeling techniques and improved functionality for creating screen designs.

Carl Larson, an analyst at Bell Atlantic Corp. in Philadelphia, is a beta user of Excelerator Version 1.9. Larson said that the added relationships and entities in the new version will help him in documenting and managing design projects.

Excelerator is available for IBM Personal Computers and compatibles for $8,400.

The new version of Excelerator is covered under Index's maintenance service as a free upgrade.

NEW DEALS

Cray, Mitsubishi ink $8.8M deal

Cray Research, Inc. announced that Mitsubishi Electric Corp. ordered a Cray Y-MP supercomputer for $8.8 million. It will be installed at the company's Large Scale Integration Laboratory, located near Osaka, Japan.

Cray will also install a Y-MP in early September at Texas A&M University. The system, capable of more than 300 million instructions per second, will play a key role in research work and participate in a campuswide network.

Jet Propulsion Laboratory in Pasadena, Calif., recently purchased two reduced instruction set computing-based multiprocessor systems from **Pyramid Technology Corp.** The Series 9000s will be used for Jet Propulsion's work on the National Aeronautics and Space Administration's (NASA) Magellan project.

Epoch Systems, Inc. in Marlboro, Mass., said it delivered an Epoch-1 Infinite Storage Server to Thinking Machines Corp. The system combines file cache memory, magnetic disks and optical disks for what the company claims is an on-line storage management system. The system allows users to store active files on magnetic disks and less important files on optical disks. The model is configured with 16M bytes of random-access memory, 1.3G bytes of magnetic storage, two tape drives and a 30G-byte optical-disk library unit.

Alliant Computer Systems Corp. sold its 25th Visualization series minisupercomputer to Lockheed Aeronautical Systems Co., a division of the Lockheed Corp. Alliant said Lockheed will use the system for flight simulation and mission planning.

Masstor Systems Corp. announced it had sold data storage systems to Boston University and NASA's Langley Research Center in Hampton, Va. The combined value of the sales is $3.? million. The Boston University system holds 220G bytes worth of data and will be used to replace a 14,000-volume tape library and 10G bytes of disk storage. At the NASA installation, the Masstor system will provide 440G bytes of data storage for supercomputing.

Goetz

FROM PAGE 25

There's some question in my mind as to whether these moves are legal under today's antitrust laws. It's true that the law does not prohibit the bundling of products per se, but it does prohibit tie-ins in which a manufacturer controls the market for one of the tied products.

In these specific instances, IBM and DEC certainly control their respective operating systems. Because these operating systems are basic to the functioning of the hardware, there is a strong argument that they are guilty of illegal bundling.

ARE IBM and DEC afraid of losing their market shares if they don't embed their major systems software products into their operating systems?

It is significant that both firms have chosen to bundle database and communications systems. The reason has to do with the overall direction that information systems is taking. Everywhere, we read the predictions for the 1990s: distributed processing, networking and mixed vendor shops. Are IBM and DEC afraid of losing their market shares if they don't embed their major systems software products into their operating systems? It would seem so.

If IBM and DEC offer their products as the "standard" for their operating systems by including them "free" in the bundle, they will preclude the need for interfaces for other products. Users will lose freedom of choice and flexibility. Vendors will lose their markets.

Independent software companies and users of IBM and DEC computers had better look carefully at this new/old strategy for several reasons.

First, the 1990s promise major growth in the number of applications that will be spread across distributed processing environments.

Second, since database and communications software are key to distributed processing, the company that controls the distributed processing environment will control the lion's share of other software purchases as well — not to mention the hardware platforms that the distributed software will operate on.

Third, there is a high probability that because of these tie-in strategies with the operating systems, both DEC and IBM will monopolize the database and communications marketplace.

For users, this will mean higher prices. It will also prevent them from integrating the software of other database vendors into the network. It will also be a lot more difficult, if not impossible, to incorporate "alien" hardware into the distributed database environment.

For the independent software vendors who compete with DEC and IBM in these arenas, this bundling strategy could well choke them to death. At minimum, it will significantly reduce their potential.

For software vendors who market other types of products, the handwriting is on the wall. It's probably only a matter of time until DEC and IBM bundle their operating systems with other system software products such as office systems, utilities, compilers, monitors, computer-aided software engineering tools and the like.

Database and communications software vendors will need to fight the uphill battle against IBM and DEC to make these companies unbundle and compete fairly. As it is, the bundling of the Database Manager on the PC will enable IBM to sell even more copies of DB2 and SQL/DS on the mainframe. And DEC's bundling will catapult the firm past its database and communications software competitors.

Where will that leave the users? To them, the bundled software may appear as "free software." But in the long run, it will be far from free.

Goetz is chief executive officer at Syllogy Corp., an IBM systems software vendor and consulting firm located in Hackensack, N.J. He holds the first patent for software, awarded in 1968.

NEW PRODUCTS — SYSTEMS

Processors

Kimtron Corp. has unveiled two terminals for the Digital Equipment Corp. market.

Called the KT-220 and the KT-220/PC, the terminals are reportedly designed for small work groups that share programs on a single hard drive. According to the vendor, the KT-220 emulates the DEC VT52, VT100 and VT220. The KT-220/PC has a personal computer mode for DOS and non-DOS multiuser operating systems and a KIX mode for Xenix and Unix. Both terminals can display up to four variable windows, have two RS-232C ports and maintain dual hosts, the company said.

Each terminal sells for $599.

Kimtron
Building 380
1709 Junction Court
San Jose, Calif. 95112
408-436-6550

Tektronix, Inc. has created a series of digital system analyzers that integrate analysis functions into a single platform.

According to the company, the Prism 3000 series offers time correlation of all data with a single master clock, time-stamping and multiple display formats such as histograms and listings of microprocessor control code. The series is reportedly capable of supporting 8-, 16-, or 32-bit processors with up to 96 acquisition channels that have clock rates to 33 MHz, nine-channel 200-MHz timing acquisition, microprocessor mnemonics disassembly, real-time performance analysis and debug tools.

The series is available for delivery in August in both portable and multislot mainframe configurations. The base price is $8,400.

Tektronix
P.O. Box 4600
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503-629-1359

I/O devices

Office Automation Systems, Inc. has introduced a laser printer developed specifically for users of IBM midrange computers, including the System/34, System/36, System/38 and the Application System/400 series.

Designated the 5215 Laser Printer, the unit is reportedly capable of producing both text and graphics at speeds up to 15 page/min., and it offers both twin axial and serial communications interfaces. The product also includes bar-code generation functions and a dual paper-feed system, the company said. It is priced at approximately $7,400, depending on options.

Office Automation Systems
9940 Barnes Canyon Road
San Diego, Calif. 92121
619-452-2427

Link Electronics, Inc. has unveiled printer protocol converters for Wang Laboratories, Inc. and Hewlett-Packard Co. users.

According to the company, the Cougar 35X is for Wang VS and OIS users, while the Lynx 25X was designed for HP 3000 Classic and HP 3000/9000 Precision Architecture systems. The converters reportedly give users access via serial or parallel ports to a variety of third-party printers including band, dot matrix, daisy wheel and laser printers. Features are said to include up to 60 resident fonts, capability of adding functions such as bar coding that might not be available from the host system, 8K of user-programmable macros and a rate of up to 75 page/min.

Cougar and Lynx are priced at $2,295 and $2,195, respectively.

Link Electronics
1360 Bordeaux Drive
Sunnyvale, Calif. 94089
408-734-4200

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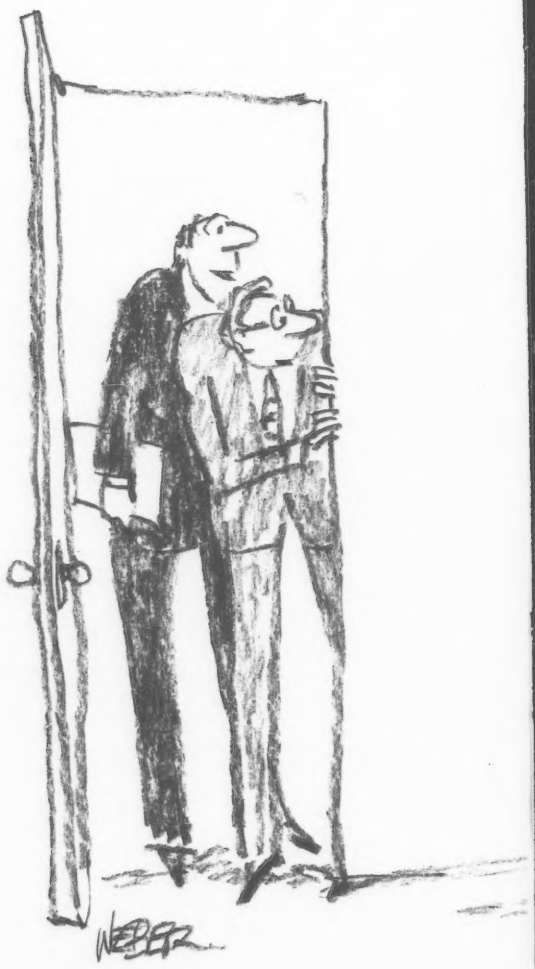

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IBM®

A video display terminal (VDT) environmental control filter designed for user protection is now available from Sunflex Co.

The VDT Environmental Control Filter is designed to eliminate glare, reflection, eyestrain and fatigue and offers protection from very low frequency radiation, according to the company. The product is priced at $69.95.

Sunflex
73 Digital Drive
Novato, Calif. 94949
800-321-1659

A printer that runs at 1,200 132-character lines per minute has been introduced by Digital Equipment Corp.

The LP37 line printer uses band-printing technology and runs at approximately the same noise level as an office copier, the company said. It has a reported heavy-duty capacity of 150,000 pages per month; applications include finance, accounting, research, marketing and statistical services. The unit is priced at $22,500 and is compatible with all DEC VMS operating systems running on VAX 8000, VAX 6000, Microvax II, Microvax 3000 and VAX-11/700 series CPUs.

DEC
146 Main St.
Maynard, Mass. 01754
800-344-4825

Acom Computer, Inc. has announced a 15 page/min. laser printer designed to accommodate magnetic ink character recognition (MICR) printing for check-writing applications in IBM midrange computer environments.

The Check Master Model MC3815 reportedly prints entire checks at a single pass with 300 dot/in. resolution. The unit operates at a speed of two seconds per check and offers a duty cycle of 25,000 pages per month. The product is priced at $10,995 and includes MICR application software.

Acom Computer
2250 Obispo Ave.
Long Beach, Calif. 90806
213-498-3638

Dranetz Technologies' *656A current and waveform analyzer*

Maintenance equipment

A voltage and current waveform analyzer that monitors both AC and DC power-line disturbances is now available from Dranetz Technologies, Inc.

Designated the 656A, the product incorporates a CRT that displays the voltage, current and impulse activity profile for the entire monitoring period, the vendor said. The unit offers an optional personal computer software analysis program that allows the user to transfer recorded data to a PC for complete analysis. The 656A is priced at $11,450.

Dranetz
1000 New Durham Road
CN-91
Edison, N.J. 08818
201-287-3680

Power supplies

Best Power Technology, Inc. has announced three customer service plans that extend basic systems warranty protection for its Ferrups and Microferrups uninterruptible power systems.

The Three-Year Extended Warranty is intended for users who have their own service organizations or are outside areas that are covered by other plans.

The Customer Protection Plan reportedly provides free labor and materials for on-site service and repair of a Ferrups unit by a factory-trained technician over a span of three years for as little as $1.24 per day.

The Three-Year Site Warranty Plan is said to be tailored for users of smaller systems and extends the basic warranty to three years with service at the customer's site for as little as 14 cents per day.

Best Power Technology
P.O. Box 280
Necedah, Wis.
608-565-7200

NEW PRODUCTS — SOFTWARE

System software

Computer Associates International, Inc. (CA) has updated its automated scheduling system for the MVS operating environment.

Release 2.9 of CA-7 reportedly features simplified product installation and initialization procedures as well as enhanced security interfaces. According to CA, the release interfaces to other CA products, including CA-Activator, an interactive, on-line product installation and maintenance system, and CA-ACF2 and CA-Top Secret access-control products.

Pricing ranges from $39,199 to $65,400, depending on system size and configuration.

CA
711 Stewart Ave.
Garden City, N.Y. 11530-4787
516-227-3300

Autovative Computer Extensions, Inc., or ACX Software, has enhanced its print monitor for the VM operating system environment.

Called ACX-PM, the monitor reportedly improves the user's management and control of printed output with such features as the capability to perform full compression on 3270 printer data streams and the use of ASCII printer features.

According to the company, ACX-PM also includes support for additional graphics and 3270 protocol converters.

The price varies from $2,000 to $20,000, depending on CPU class and options required, the company said. Leasing rates are available.

ACX Software
Suite 250
1300 Iroquois Drive
Naperville, Ill. 60540
312-983-5555

Development tools

Programart has announced Release 8 of its Strobe Performance Measurement System, application-tuning software that reportedly addresses the causes of excessive resource demand by pinpointing waste and inefficiency in applications.

The software product is said to improve the performance of on-line and batch processing applications in test and production by attributing resource use to the user code that invoked the service routine. According to Programart, Strobe measures the performance of applications running in IBM MVS/370, XA and ESA environments.

The base price is $37,800, with many additional feature options available.

Programart
1280 Massachusetts Ave.
Cambridge, Mass. 02138
617-661-3020

AI Corp. has upgraded its expert system development tool for IBM environments.

The performance of Knowledge Base Management System 402 has reportedly been improved by a minimum factor of 20 over its predecessor and includes an IMS interface that is said to provide for either automatic or manual access to IMS databases. According to AI Corp., other improvements include techniques for compiling rule functions, memory management and network management.

The initial license fee for the IBM mainframe version is $90,000; the license fee for the personal computer MS-DOS version is $5,000; and an OS/2 version is listed at $7,500.

AI Corp.
100 Fifth Ave.
Waltham, Mass. 02254-9156
617-890-8400

Applications packages

Selecterm, Inc. has introduced its Microscript Insurance series of software products that reportedly allow the integration of dissimilar computing systems and insurance application programs.

According to Selecterm, the software products provide a single-entry interface and link agency management systems, rating systems, carrier interfaces and other computer applications and systems. Running on most Intel Corp. 80286 and 80386 MS-DOS computers, the price of a single-user license is $2,000, and site licensing is available.

Selecterm
153 Andover St.
Danvers, Mass. 01923
617-246-1300

Cadam, Inc. has added two productivity tools to its mainframe-based computer-aided design system for architects, engineers and construction specialists.

According to Cadam, the tools are Rebar, a program that helps designers produce reinforced concrete and steel detail drawings and associated bills of materials, and the Engineering Catalog Design Base (ECDB), a data management tool that allows designers and nonprogrammers to create and modify project design information stored in a relational database. The two were developed as elements of the AEC Design system.

Rebar is priced at approximately $20,000 for an IBM multiuser environment; ECDB pricing is tiered, ranging from $4,000 to $30,000. Both are scheduled to be available in the fourth quarter.

Cadam
1935 N. Buena Vista St.
Burbank, Calif. 91504
818-841-9470

Artificial intelligence

Information Ink Ltd. has announced an artificial intelligence language tailored for problems that require cognitive and/or digital signal proc_ssing.

Symbolic Language for Automated Verification and Execution, or SLAVE, can be used in such areas as speech recognition, speech simulation, image processing and digital voice protection. The cost for a one- to four-user site license is $10,000.

Information Ink
1273 E. 93 St.
Canarsie, N.Y. 11236-0115
718-257-6486

Software Artistry, Inc. has introduced two expert system development packages.

Application Software Expert (ASE) was created to provide an expert system development platform for the IBM Application System/400 midrange computer, according to the vendor. Features reportedly include backward and forward chaining, demons, methods and a knowledge base compiler. Pricing ranges from $5,000 to $30,000, depending on configuration.

PC Expert Professional is reported to be an expert system library with routines that can be embedded into C, Pascal or Modula 2 applications. Designed for an IBM Personal Computer or compatible environment, it incorporates an inference engine and knowledge bases generated by the product that are source code-compatible with the company's ASE package, the vendor said. It is priced at $495.

Software Artistry
Suite 2021
3500 DePauw Blvd.
Indianapolis, Ind. 46268
317-876-3042

Training

A suite of IBM Application System/400 education courses designed to provide IBM System/36 users with the ability to effectively implement AS/400 concepts has been announced by Clarion Technology Exchange.

According to the company, the nine-class suite held at Clarion's Education Center in Fairfield, Conn., may be taken in stages to enable participants to experience the maximum benefits of each stage.

The suite includes AS/400 Concepts, four days long, for $920; RPG/400 for RPG II Programmers, three days long, for $690; and Control Language Workshop, two days long, for $460. Courses can be established at the client's site.

Clarion Technology
P.O. Box 844
Fairfield, Conn. 06430
203-254-0585

SMALL TALK

Douglas Barney

Home mart face-lift

If anybody tries telling you that the home personal computer market has nothing to do with information systems, do one simple thing: Laugh in his face. Anybody who makes such an argument is living in the past, when the home market was the world of Apple IIs and other lightweight 8-bit computers. This market, by and large, has fallen apart, along with the credibility of anyone who argues differently.

Today's home market is different. Sure, kids still play games and break into databases that they shouldn't touch. And people buy machines that are specific to the home and excel at games and such.

But if you look at the rising software stars in the home market, it would read like a who's who of PC productivity software. Lotus' 1-2-3, Ashton-Tate's Dbase and Wordperfect's Wordperfect are the new home applications, and they are not used by prepubescents. Home PCs are used by moms and dads bucking for a promotion at work or looking to spend more time with the family. And it is not Apple IIs,

Continued on page 40

Users praise CD-ROM support

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp.'s CD-ROM-based support system got high marks from users interviewed recently by *Computerworld*.

The $995 Prompt CD system stores all Lotus technical support data on compact disk/read-only memory (CD-ROM) disks, allowing internal personal computer support professionals to respond more quickly to end-user inquiries. It contains some 2,600 technical support notes, evaluation and demonstration versions of software, on-line copies of *Lotus Magazine*, product upgrade information and press releases as well as add-in programs.

The product is targeted at information center managers, microcomputer managers, IS professionals or anyone who supports large numbers of PC users.

Early criticism

Early critics chastised Lotus for charging for support that would ordinarily be free. In addition, critics alleged, Lotus would save money by receiving fewer support calls.

Apparently, many customers do not see it that way.

Litton Computer Services uses Prompt CD, and it likes what it sees. Instead of having end users call Lotus and play phone tag with the support staff, the firm can dial into Prompt CD and get its own answers, explained Mark James, manager of professional computing at Litton Computer Services, which is a division of Litton, Inc.

In addition, users can download the solution to their problem and keep it on hand. The system includes product fixes and even macros, which users can download freely.

Litton, which is used to solving its own problems, was spending a great deal of time supporting its 100 PC users.

"It used to take us hours and hours of research," James said.

Many corporations have specialists in particular packages and rarely call the software provider directly. The Lotus product, users said, makes these people more productive and able to support more users and packages.

Bob Martin, manager of executive support systems at Eaton Corp., is another fan. Martin said he finds the product to be very valuable and is looking to put it on a local-area network so it can see broader use. He praised Lotus for the timeliness of the information, which is updated monthly. Older disks can be distributed freely, Lotus officials said.

Updated monthly

Some 100 new technical notes are added each month, and information on Lotus' 1-2-3 Release 3.0 is already on the way. In addition, the system includes information on earlier products such as 1-2-3 Release 1A.

The $995 system does not include a CD-ROM player, which must be purchased separately.

The product is part of a broad push by Lotus into the information services market. Other available IS products include stock information and historical business data.

Metaphor introduces new 386 workstations

BY MICHAEL ALEXANDER
CW STAFF

MOUNTAIN VIEW, Calif. — Metaphor Computer Systems, Inc. said recently that it plans a fourth-quarter shipment of its first Intel Corp. 80386-based workstations capable of running the MS-DOS and OS/2 operating systems as well as the company's own software.

Metaphor will ship two workstations, a 16-MHz 386-SX Model 216 and a 20-MHz 386 Model 220. Model 216 prices fall between $4,800 and $5,995, depending on the volume purchased; Model 220 prices range between $6,300 and $7,800, also based on the number of units purchased.

The workstations also run Metaphor's Data Interpretation System (DIS), a relational database with a graphical interface that is aimed at business professionals who must access multiple databases and create their own applications and reports. The DIS consists of software running on a local-area network of servers and workstations that communicate with relational databases residing on Metaphor database servers or on host machines, such as mainframes, that the DIS accesses via database gateways.

Standard features

The two models come standard with an Ethernet adapter connecting the workstation to a DIS network, 4M bytes of random-access memory and a graphics adapter and monitor.

The monitor is capable of running the color version of Metaphor DIS software as well as supporting DOS and OS/2 applications in IBM's Video Graphics Array, Enhanced Graphics Adapter and Color Graphics Adapter modes.

The company also said that it plans to ship gateways and communications products that let users of its Data Interpretation System access IBM DB2 and SQL/DS databases running on IBM mainframes or compatibles. IBM, which has a minority stake in Metaphor, will offer similar products, Metaphor said.

Inside

- Fairfax county taps tireless teaching tool. Page 37.
- Polaroid disk guarantee gets customers out of the drink. Page 37.

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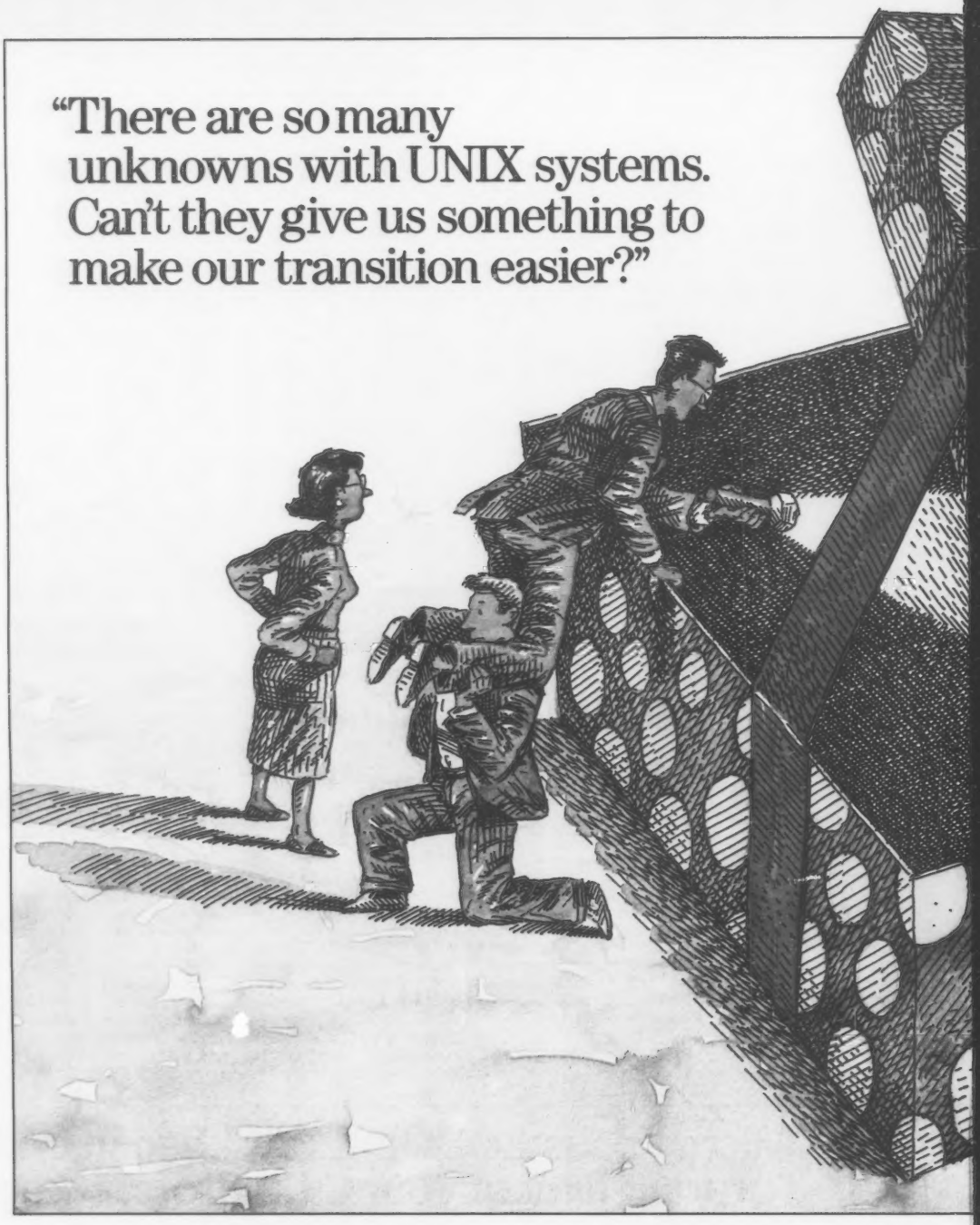

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*Series 800 models available for this trial are: 825S, 835S, 835SE, and 850S.
**Based on 1988 worldwide sales. Source: IDC.

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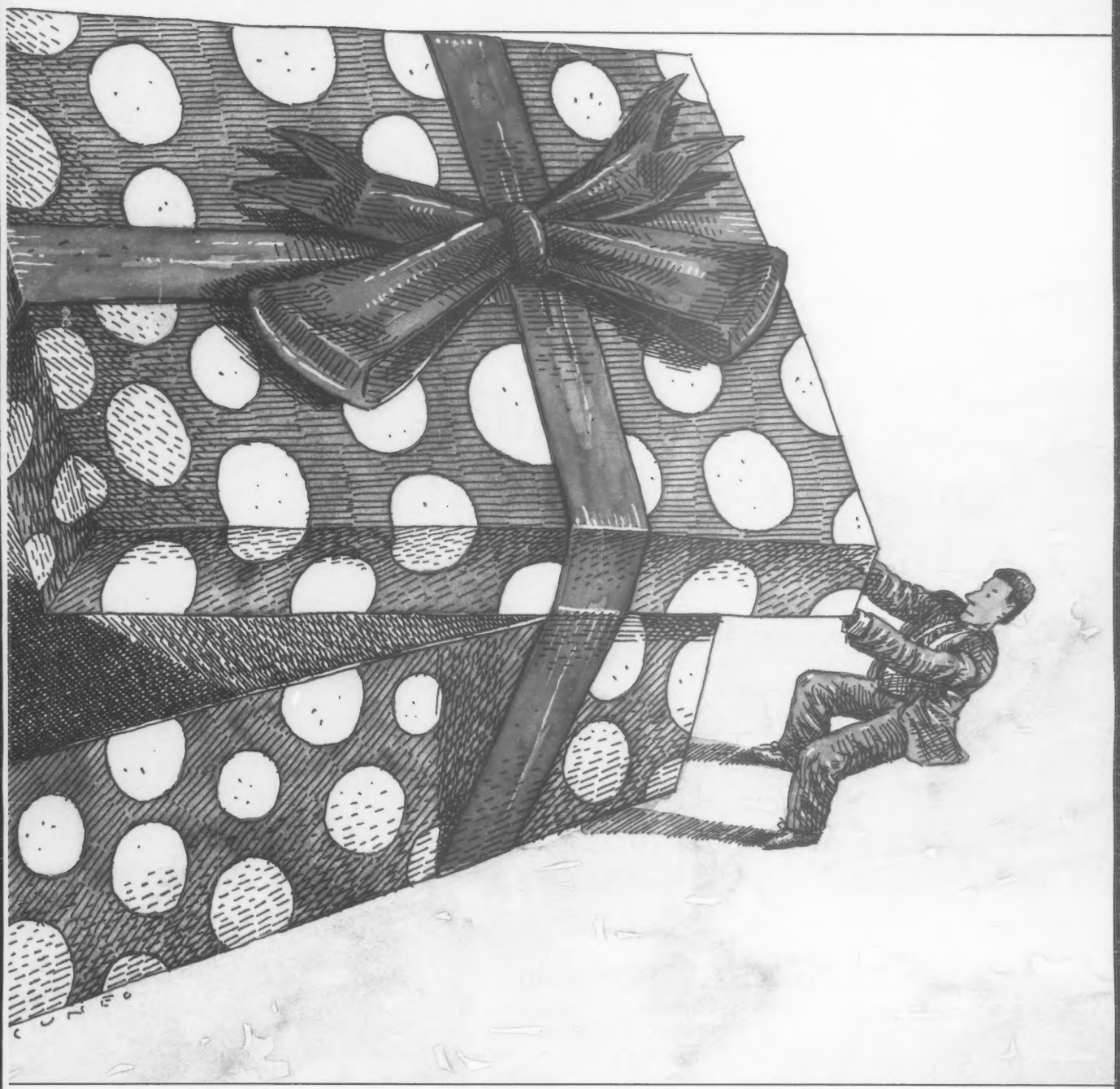

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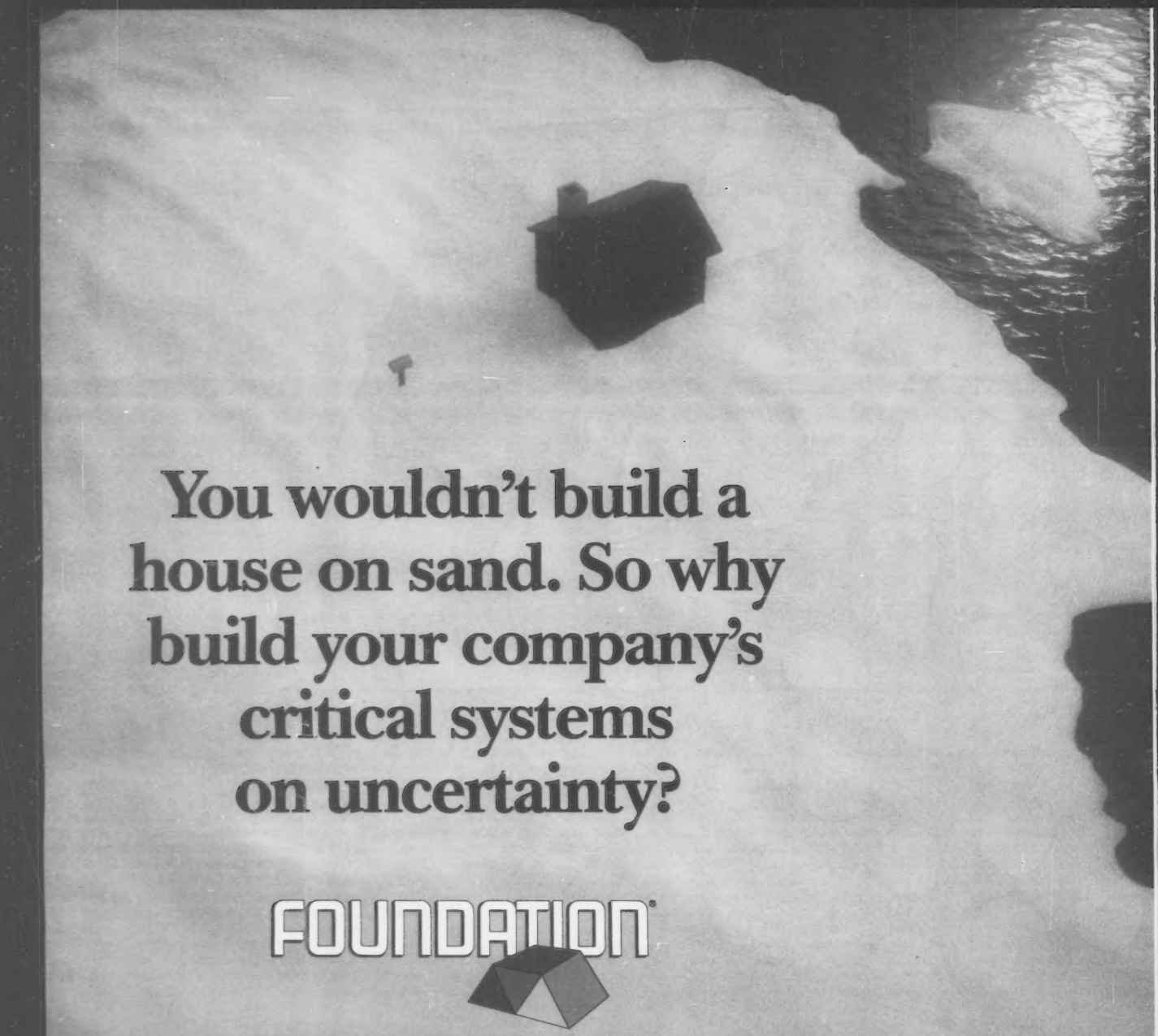

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Video tool to help teach TV generation

ON SITE

BY MARYFRAN JOHNSON
CW STAFF

FAIRFAX COUNTY, Va. — Teachers in this sprawling, affluent school district outside Washington, D.C., will begin the new school year with a high-technology teaching assistant who can work round-the-clock.

The assistant is the latest in electronic learning aids — a special "jukebox" loaded with videodisks rather than rock 'n' roll records.

In a pilot project linking Pioneer Communications of America, Inc.'s Video Juke Box with personal computer technology, cable television and the *Video Encyclopedia of the 20th Century*, the school district is creating an on-line system that teachers and eventually students will use to produce anything from "video term papers" to customized lessons that catch the attention of today's video generation.

"Teachers don't want canned materials anymore," said Glenn Kessler, director of media at the Fairfax County Public Schools Cable Network. "They used to have to show a 25-minute movie for three minutes of concept. Now they want to be able to pull out that three minutes without it being a big deal."

The project is a joint venture of IBM, Fairfax County schools, Pioneer and CEL Communications, Inc., which copyrighted the video encyclopedia.

Fairfax County, whose 135,000 students make it the 10th largest school district in the nation, is populated with congressmen and other national heavyweights. With four television studios, the school system is fertile ground in which to plant new video technology.

"We have six cable channels available to over 200 locations, plus two to the home," Kessler said. "We're on the cutting edge of coming up with ways to use technology, to make information more available. We're talking about breaking down the barriers between text and graphics."

Fairfax Public Schools' Kessler

The Juke Box will spend its first 18 months as a working model in a center that serves the district's 5,500 teachers.

"Our goal is to eventually have the students using this video database," Kessler said. Providing cable access to the database will lay the groundwork for an information network that blankets the 400-square-mile school district, he added.

By mid-1991, the district plans to move the Juke Box and *Video Encyclopedia* into Centerville High School, where a multimillion-dollar electronics system has equipped each department with its own computer lab and interconnected them all through a Token-Ring to the library's on-line database.

Working at home or in school, students could use Linkways software, an object-oriented, mouse-driven program that builds interfaces between various applications, to load the encyclopedia's index into their machines. They could scroll through the index of topics, picking and choosing the visual images — film clips or text — that best illustrate their theme, Kessler explained. Using their modems, they could then download their newly minted production into the resident machine controlling the Juke Box.

"This is different from just hardware or a gadget. This is a resource, a different format for information," said Terry Woolsey, communications coordinator for the Fairfax County school system.

If the project takes off, its impact could "span the curriculum" from science and social studies to language arts. "Imagine a language arts class using a Martin Luther King speech as a springboard to a writing assignment," Woolsey said.

For its part in the project, IBM purchased a Pioneer Juke Box and is now loading the encyclopedia's four-volume index into it with Linkways. The 79 hours of footage on 40 two-sided videodisks will be accessible within seconds to users through the PC-controlled videodisk changer.

The school district will use an IBM Personal System/2 Model 25 for the project, but any PC with an RS-232C serial port connection will work with the videodisk changer, according to a Pioneer spokesman.

The details of who pays for what have not been worked out yet, Kessler said; each party is making in-kind contributions.

Cleanup a snap with Polaroid plan

BY RICHARD PASTORE
CW STAFF

Twenty-nine floppy disks swimming in Coca-Cola. An absurd image, but definitely not a funny one for Betty McDonnell, who spilled her drink into an open case of disks holding oil- and gas-related insurance policies for Lloyd's of London clients.

Fortunately, the disks were made by Polaroid Corp. and covered by that company's Datarescue guarantee. McDonnell sent the disks to Polaroid, which recovered 100% of the data, transferred it to fresh disks and sent them back to McDonnell — all free of charge.

The service saved McDonnell, manager of word processing at insurance firm Burke-Daniels Co., the 250 hours it would have taken to restore the data, which was not backed up in its latest version.

"I would have paid anything to have that done," she said, "and they didn't charge one dime."

Tom Witte, director of electronics at Texas Vocational Schools, would have had to spend 50 to 70 hours recreating tests and course outlines that were rendered inaccessible by a bad directory and file allocation table on his Polaroid disk. Instead, Polaroid removed the errors and returned the disk to him in working order in a couple of weeks.

Kim Kisla, a secretary at a Chicago-area chemical company, thought she had lost 50 hours worth of her boss' letters when her system refused to let her access the files. "I started screaming, and the woman who sits next to me said I could send the disk back to Polaroid," said Kisla, whose company wished to remain anonymous.

"There was no way I could have gotten the information back without my boss doing the letters all over again," Kisla said. She had already erased the cassette tape that held the lengthy letter dictation. Polaroid fixed the problem and restored 100% of the information.

These people are three among thousands who owe their salvation to the Datarescue program, a 4-year-old service that Polaroid instituted as a way to distinguish its brand of 5¼- and 3½-in. disks from those of its competitors and build customer loyalty, according to Stuart Schwartz, president of Polaroid's Mag-Media Ltd. subsidiary and general manager of its magnetics division.

Datarescue continues to be the only service of its kind, boasting an average turnaround time of 48 hours and handling about 2,000 disks a year, Schwartz said. The program accepts only Polaroid disks for recovery.

There are no user costs other than one-way mailing charges and no limit on the number of disks that can be submitted, but

Continued on page 42

4 Should a PC database server connect to DB2?

YES. A complete PC database server must be able to access data transparently from corporate mainframes and minicomputers. Gupta's SQLBase is the only database server that connects to DB2. Because SQLBase is faithful to the SQL standard, applications written for SQLBase can access DB2 or Oracle databases with virtually no change. To learn the rest of the story, call the database server experts toll-free, 800-876-3267.

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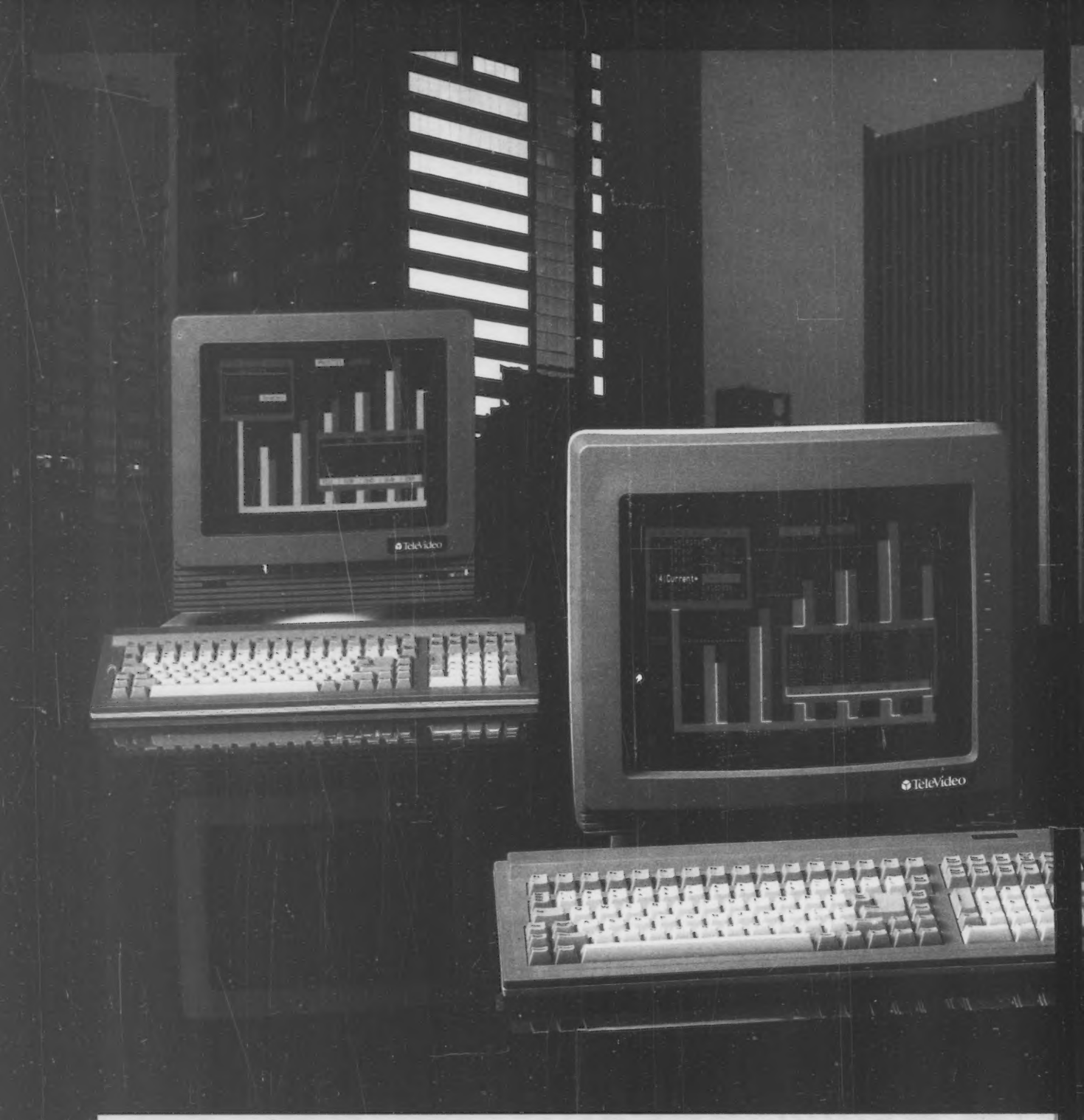

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Software Garden blossoms with new printing software

BY DOUGLAS BARNEY
CW STAFF

NEWTON, Mass. — Dan Bricklin said he developed the Pagegarden program because he needed it.

Bricklin, who runs Software Garden, Inc. out of his house, is a jack-of-all-trades. He writes the software, creates the manuals and ships the product. Much of what Bricklin does involves laser printers. Letters, mailing labels and documentation necessary for the smooth operation of a software concern are best done on a laser printer.

To automate these printing processes, Bricklin, co-creator of the original electronic spreadsheet, began to write Pagegarden last September. The nearly complete $100 product is aimed at repetitive printing tasks such as envelopes, forms, labels, listings and reports. With the Pagegarden product, which includes its own page description language, users can run printing jobs in a batch fashion.

In addition to automating printing tasks, the Pagegarden program reportedly gives users greater control over the output. In fact, with Pagegarden, users can position elements to within 1/300th of an inch.

Pagegarden includes bitstream fonts and more than three dozen page description scripts for particular printing jobs and comes on both 5¼- and 3½-in. disks. Pagegarden will ship early next month and will be available from software retailers.

The package runs on IBM Personal Computers, Personal System/2s and compatibles and works with a variety of laser printers. Bricklin is so confident that Pagegarden will succeed that he is ready to move into real office space.

Barney

CONTINUED FROM PAGE 33

but MS-DOS machines (or at least MS-DOS emulators) that populate these homes.

The new uses of home computers make them a critical issue for IS and PC vendors. Some of these home users are chief executive officers, vice-presidents, chairmen and presidents. IS generally reports to people with these types of titles. Other home users are reliant on IS in the office but cut free when they compute at home. IS serves these people.

Taken together, this group represents both a burden and an opportunity for IS. The burden is the support of remote hardware and software with God-knows-what add-in products and kludges. It is an also an opportunity for IS to become heroes by making home computing pay off for the user and the company.

IS staffers can make users more productive with training on modem access to hosts, remote use of the office PC and file sharing. They can also deal with increasingly tricky issues such as keeping home and office PCs in sync. Until now, most people could run the exact same software at home or at the office. Sharing files was easy, and they only needed to memorize one set of arcane software commands.

UNTIL NOW, most people could run the exact same software at home or at the office. Sharing files was easy, and they only needed to memorize one set of arcane software commands.

While graphical user interfaces, OS/2, Lotus' 1-2-3 Release 3.0 and 32-bit software are great for office use — where budgets are loose — they bring most home computers to their knees.

IS is the group that can counsel people on making these systems work together. For instance, with 1-2-3 Release 3.0, IS can explain to users how to create models that are still readable on less powerful machines, or they can suggest a spreadsheet such as Computer Associates' Supercalc5 that has additional power but works on most MS-DOS machines.

IS may also suggest that when users request hardware, they go for high-powered portables such as the oft-criticized IBM Personal System/2 Model 70 Portable. This machine is appropriate for one niche and one niche only: the home office user. With its 32-bit bus, 32-bit processor and IBM Video Graphics Array graphics, this machine allows users to run the piggish OS/2 at home and at work. They just need to cart the thing back and forth for weekends and occasional evening work.

This is probably not news to ambitious ISers, anyway. Many of you already have home computers and get to play with Cobol, CICS and Oracle.

Barney is a *Computerworld* senior editor, PCs and workstations.

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POWER PROTECTION SYSTEMS

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CAI touts Postscript for Mac

BY MICHAEL ALEXANDER
CW STAFF

BILLERICA, Mass. — Color Postscript language output to film recorders and printers was once merely a dream for the typical Apple Computer, Inc. Macintosh user. But now, Custom Applications, Inc. (CAI) offers Freedom of the Press, which it said is the first Adobe Systems, Inc. Postscript language-compatible interpreter for Apple Macintosh computers.

The package, which has a suggested retail price of $495, allows Macintosh users to send color graphics and text to more than 40 different printers and film recorders to produce Postscript language text and graphics output, CAI said. It includes 35 outline fonts similar to those found on an Apple Laserwriter Plus and an intelligent font scaling system for arbitrary point sizes and rotation angles.

The software supports the entire Postscript language command set, including color extensions and 24-bit color images, the company said. The firm claimed to be the first to provide a Postscript-compatible product for the Macintosh market.

Freedom of the Press runs on Apple's Macintosh II, IICX, IIX and SE30 computers with 2M bytes of random-access memory. It can use small computer systems interface, serial or parallel ports to send the page image in graphics mode to a supported printer or film recorder.

The supported color devices include color thermal transfer printers from California Computer Products, Inc. and Seiko Instruments, U.S.A., film recorders from Presentation Technologies and Lasergraphics, and color ink-jet printers made by Hewlett-Packard Co., Howtek, Inc. and Xerox Corp.

The product will be unveiled at the Macworld Conference and Exposition in Boston Aug. 10-12 and should ship that month, according to CAI.

SAS/QC adds more tools for PC users

BY RICHARD PASTORE
CW STAFF

CARY, N.C. — The personal computer complement to the SAS System — integrated software for data management, analysis and presentation — was recently filled out with the SAS/QC statistical quality improvement program from SAS Institute, Inc.

Previously exclusive to mainframes and minicomputers, the SAS System, through the SAS/QC package, now provides PC users with statistical tools for quality improvement in production from the design of a product through the actual production process, according to a company spokesman.

The PC-based release includes tools for experimental design and statistical quality control — specifically, procedures for building fractional factorial designs and selecting an optimal design from a given set of points. A menu system also lets users build and analyze designs for standard applications.

Other SAS/QC capabilities include Shewart charts (graphical tools for determining statistical control of a process), histograms, quantile-quantile plots, capability indexes, summary statistics and probability plots.

SAS/QC runs on IBM Personal System/2s and Personal Computer ATs and compatibles running under the PC-DOS and MS-DOS operating systems.

The first-year license fee for the software product, which is now shipping, ranges from $395 for a single unit to $7,500 for 500 units. Other components of the SAS System are licensed separately.

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New York bank finds PCs speed time-honored task

ON SITE

BY MICHAEL ALEXANDER
CW STAFF

NEW YORK — Making money the old-fashioned way no doubt has its rewards, but sometimes that can be bad for business. To resolve that dilemma, First New York Bank for Business turned to personal computers to speed outmoded methods of verifying signatures on checks presented by its commercial customers.

As is the norm at nearly all banks, before any of the bank's tellers can hand over cash to a customer, they are required to verify that the check's endorsement and the authorized credit limits are indeed accurate. Until recently, even the largest and most automated banks had to verify signatures on checks the old-fashioned way — by sending someone to retrieve one of two signature cards on file either in the branch where the account was opened or the bank's central bookkeeping department. Finding the right card could sometimes take as long as 30 minutes.

At peak traffic hours such as lunchtime and payday, the lines of customers waiting to cash checks would back up, and the delays became interminable.

To speed the check-cashing process, First New York has installed a micro-based signature verification system called Signet, developed by GMB Technology, Inc., a New York computer consulting firm. With Signet on an IBM Personal System/2 or compatible with an IBM Video Graphics Array graphics adapter, tellers at the main branch can instantly retrieve and display a computerized color image of a customer's signature by name, account number or customer code from anywhere in its systems, including branch offices.

The check verification system is being used to automate "back office" check verification procedures at the main bank but will be eventually expanded to branch offices, said Dan Kimchi, first vice-president of bank operations and information services.

Using an IBM PS/2 Model 50 tied into a local- and wide-area network of about 35 PCs, a teller can immediately verify the check endorser's signature as well as such information as alternate designees with authority to sign checks, multiple signature requirements for certain business accounts, account balances and credit limits. The program can also be used to maintain a database of digitized identification pictures that include signatures from each account.

The $10,000 software has allowed the bank to shave several minutes off the time it now takes to verify a customer's check-cashing information. In most instances, a transaction can now be completed in less than a minute, Kimchi said.

The biggest advantage is better service, Kimchi said. "Once a customer banks with you, especially a business customer, the only reason he's likely to change banks is bad service," he said. "Otherwise, we all offer pretty much the same rates and services. So if we can save a customer time waiting in line, if we can provide faster, more accurate, better quality service . . . we've got a happy customer."

First New York Bank has been steadily expanding a local-area network it started in 1987 to handle much of the bank's business. The signature verification application is the latest in a series of steps to automate its business, Kimchi said.

A PC station costs an average of $3,000, which, according to Kimchi, is typically depreciated over five years. "That's less than $1,000 per year," he said, "and if that machine saves only two or three weeks of an employee's time in the course of a year, which is a very conservative expectation, you get your investment back in less than a year."

"Obviously, these people never considered the advantages of incorporating planned rentals into their capital equipment acquisition strategy."

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Data insurance

CONTINUED FROM PAGE 37

there is also no guarantee of 100% recovery success.

Polaroid cannot restore data on disks that have been "spindled, folded or mutilated," Schwartz said. "Another reason we might not be able to recover is if you put it into a stong magnetic field."

Disk utilities programs can also render data unrecoverable. "People think commercial utilities are easy to use, but they are not quite that easy," Schwartz said. "Once you start to manipulate your own data internally, you may get it to the point of never being able to recover it again."

Bad directories, disk clusters and hard-logic trouble are problems that Polaroid can handle with varying success. Polaroid technical staff hunts down and removes these errors with logic audits. The coffee baths and mustard treatments are "almost a sure thing to fix," Schwartz said. The doused disks are removed from their sleeves and scoured clean by proprietary processes.

NEW PRODUCTS

Systems

Sigma Designs, Inc. has introduced Pageview, a 15-in. monochrome display system for the IBM Personal Computer and Personal System/2.

The system reportedly provides single-page desktop publishing and word processing capabilities. According to the company, the monitor has a resolution of 768 by 1,024 pixels and provides 66 lines of text on a standard 8½- by 11-in. document at six line/in. The PC version includes the monitor, display adapter and MDA/Hercules emulation and is priced at $1,395. The PS/2 Micro Channel Architecture version includes the monitor, display adapter and IBM's Video Graphics Array and sells for $1,495.

Sigma Designs
46501 Landing Pkwy.
Fremont, Calif. 94538
415-770-0100

Paravant Computer Systems, Inc. has introduced the RLT-88, an environmentally tough laptop computer.

The RLT-88 was reportedly designed to meet MIL-STD-810D military specifications. In addition, it has an MS-DOS Version 3.21 operating system, 512K bytes of random-access memory, a 128K-byte read-only memory operating system and a mass storage system that uses either two or four memory cards with a capacity of 8M bytes each. According to Paravant, harsh conditions that the computer can withstand include severe shocks, total immersion in water, extreme temperatures, solar radiation, sand and dust, salt fog, vibration and altitudes up to three miles.

The price for a single unit, less memory cards, is approximately $7,000.

Paravant Computer
305 East Drive
West Melbourne, Fla.
407-727-3672

Software applications packages

Ski Soft Publishing Corp. has introduced Eye Relief, a full-function word processing package that displays and prints large-size type.

The product was designed specifically for the vision-impaired and those who work with laptops in poorly lit areas, such as airplanes and press rooms, the company said. Users can also select display modes ranging from 100% to 300% magnification of normal size.

Eye Relief can run on laptop computers and any IBM Personal Computer or compatible with a graphics display, 512K bytes of random-access memory and a floppy disk drive. The product sells for $295, according to the vendor.

Ski Soft Publishing
Suite 79
1644 Massachusetts Ave.
Lexington, Mass. 02173
617-863-1876

Lexpertise U.S., Inc. has released a proofreading software package for IBM Personal Computers and MS-DOS-compatible systems.

PC Proof 1.1 reportedly scans text for errors in style, word usage, spelling, capitalization, punctuation and double words. It can be used with any unformatted DOS ASCII file and requires a minimum of 640K bytes of random-access memory. PC Proof 1.1 costs $159, the vendor said.

Lexpertise U.S.
Suite 900
9 Exchange Place
Salt Lake City, Utah 84111
801-350-9100

Golden Software, Inc. has enhanced its menu-driven, three-dimensional contour and surface plotting package.

The Surfer program was designed to visualize multivariate data, and Version 4.0 provides several additional capabilities, the vendor said. These reportedly include axis titles, user-specified color contour ranges and on-screen text manipulation. The package runs on IBM Personal Computers, Personal System/2s and compatibles and is priced at

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$499. Both 3½- and 5¼-in. disk formats are available, according to the vendor.

Golden Software
P.O. Box 281
Golden, Colo. 80402
800-333-1021

Zsoft Corp. has introduced PC Paintbrush IV, an image processing package for business presentations and desktop publishing applications.

The software is designed for creating, refining and retouching images and offers support for both outline and bit-map fonts, the vendor said.

The product reportedly provides blend, smudge, gradient, tiling, tint and brightness and contrast capabilities and supports 256 on-screen colors.

An IBM Personal Computer, XT, AT or compatible with 640K bytes of memory, DOS 3.0 and a drawing device are required. The package is priced at $99.95.

Zsoft
Suite 100
450 Franklin Road
Marietta, Ga. 30067
404-428-0008

Software utilities

Helpful Programs, Inc. has released Version 3.1 of the Installation Toolkit, an installation utility for MS-DOS-based systems.

The product was designed to lower development and support costs and can be used by both programmers and nonprogrammers, the vendor said. The program runs on IBM Personal Computers, Personal System/2s and compatibles and reportedly requires little or no prior knowledge of the ultimate installer or target computer. System diagnostic capabilities are also included. The product is priced at $99.

Helpful Programs
Suite 912
Central Bank Bldg.
Huntsville, Ala. 35802
800-448-4154

Programming Technology has announced Disk Publisher, an IBM Personal Computer-based disk publishing software program.

With Disk Publisher, authors and businesses are able to publish information at a low cost by using the software product's ability to create and organize text files into a booklike format for distribution on disk, according to the vendor. The program is said to be written in C and assembly languages and comes equipped with a setup program, a text editor and a runtime module. It is available for a limited time at an introductory price of $69.95.

Programming Technology
2800 Boone Ave. N.
Minneapolis, Minn. 55427
612-541-9998

Rosesoft, a division of Intergy, Inc., has upgraded its Prokey Plus macroprocessor.

Version 5.0 reportedly works with Microsoft Corp.'s Word 4.0 and 5.0, Wordperfect Corp.'s Wordperfect and IBM Personal System/2 computers. According to Rosesoft, additional features include Lotus-style pull-down menus, user-created Help messages and pop-up user prompts. The product requires an IBM Personal Computer, AT, Personal System/2 or compatible and uses 58K bytes of random-access memory.

The list price is $99.95, and updates for registered users are $39.95.

Rosesoft
P.O. Box 70337
Bellevue, Wash. 98007
206-454-7424

Touchstone Software Corp. has upgraded its IBM Personal System/2 diagnostic software utility program.

Dubbed Checkit Release 2.0, the utility reportedly builds upon the testing and reporting capabilities of the earlier release. The new release provides simplified menu access to individual tests, graphic indicators that show testing progress, optional error logging to disk or printer and new program setup options. Testing features are said to include compatibility with more types of devices and processor configurations, procedures to test printers and parallel ports and increased reporting detail.

Checkit retails for $149, but users of earlier releases can upgrade for $25.

Touchstone Software
Suite 207
909 Electric Ave.
Seal Beach, Calif. 90740
213-598-7746

A hard drive-to-hard drive automatic backup software program for stand-alone personal computers is available from Disktec, Inc.

According to the vendor, Shadowbak permits data to be written to two standard hard drives simultaneously, providing for continuous, fault-tolerant and transparent backup. Reportedly designed for IBM PC BIOS-compatible PCs with DOS 2.0 or higher, the program supports drives with any head or cylinder configuration and is partition-selectable. The price is $149 with volume purchasing and site licensing available.

Disktec
4545 S. Pinemont
Houston, Texas 77041
713-460-9650

Data storage

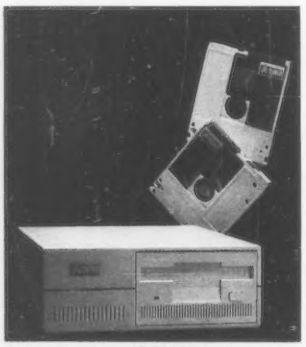
Maynard Electronics, Inc. has enhanced its Maynstream tape backup software.

Maynstream Version 2.5 provides support for Apple Computer, Inc. Macintosh and IBM Personal Computer files and folders on Novell, Inc. Netware Version 2.15, according to the company. This support reportedly includes automatic backup of files, various logging capabilities and one-keystroke securing and backup of all networked information and communications, such as electronic mail messages.

Maynard Electronics also announced that it plans to bundle the Map Assist disk-access utility from Fresh Technology Group with Maynstream Version 2.5 for the 2200HS tape backup system.

Existing users can upgrade to Version 2.5 for $89. Systems range in price from $895 to $7,595, depending on storage capacity.

Maynard Electronics
460 E. Semoran Blvd.
Casselberry, Fla. 32707
407-263-3500



Sumo Systems' *RSSM600*

Storage Plus, Inc., which is now doing business as Sumo Systems, has announced a rewritable, erasable optical-disk subsystem for the IBM and Apple Computer, Inc. marketplaces.

The company said the RSSM600 series includes a 600M-byte optical disk manufactured by Ricoh Co. Ltd., an enclosure, a small computer systems interface cable, documentation, a host adapter card for the IBM subsystem and INIT-installation software with icons for the Apple Computer, Inc. Macintosh version.

The product's access time is 50 msec, and the unit can be used as the primary boot device (under DOS 4.0 for the IBM version), the company said.

The IBM version of the subsystem, RSSM600-C, has a list price of $4,700; the Apple version, RSSM600-B, is priced at $4,500. The cartridge price for both is $260.

Sumo Systems
Suite C103
1580 Old Oakland Rd.
San Jose, Calif. 95131
408-453-5744

CMS Enhancements, Inc. has introduced 20M- and 40M-byte Integrated Drive Electronics (IDE) versions of mass data storage subsystems for users who want to upgrade their AST Research, Inc. (AST) Bravo 286 personal computers.

According to the company, the subsystems use the standard 40-pin AT bus interface, allowing them to be plugged directly into the Bravo's hard-drive connector on its motherboard.

Available immediately, the AST Bravo 286 subsystems are $599 and $699 for the 20M- and 40M-byte models, respectively.

CMS Enhancements
1372 Valencia Ave.
Tustin, Calif. 92680
714-259-9555

Toshiba America, Inc.'s Disk Products Division has announced a stand-alone, 5¼-in. write-once optical-disk drive with plug-and-play compatibility.

The WM-S070 reportedly operates with IBM Personal Computers, Apple Computer, Inc. Macintosh machines, Sun Microsystems, Inc. workstations and Digital Equipment Corp. VAX computers. The drive provides 600M bytes of storage capacity and can support as many as eight daisy-chained write-once read-many drives for archival storage, the vendor said.

The WM-S070 costs $3,595, and quantity discounts are available.

Toshiba America
9740 Irvine Blvd.
Irvine, Calif. 92718
714-583-3108

Peripherals

Canon U.S.A., Inc. has launched a series of laser-beam printers said to employ a controller that has vector graphics functions and increased memory.

The devices provide scalable fonts, a 32-bit microprocessor and 1.5M bytes of built-in memory, according to the vendor. Other features include both serial and parallel interfaces, two font-card slots and an expansion slot for an optional video interface adapter.

The series reportedly includes three models: the basic LBP-8 Mark III model, the LBP-8 Mark III T double-cassette model and the LBP-8 Mark III duplex-printing model. They are priced at $2,995, $3,995 and $4,495, respectively.

Canon U.S.A.
One Canon Plaza
Lake Success, N.Y. 11042
516-488-6700

Genicom Corp. has announced the availability of its 6100 Series Laser printers.

According to the company, the series offers a variety of standard and optional functions, including 400 dot/in. resolution, a print rate of eight page/min., a proprietary page description language, several printer emulations and 37 outline fonts. Targeted for sophisticated text and graphics applications, the units are priced from $4,295, the company said.

Genicom
Genicom Drive
Waynesboro, Va. 22980
800-535-4364

Board-level devices

Redlake Corp. has announced a single-screen digitizer, frame grabber overlay card for merging live video and graphics on a single screen.

According to the vendor, the Spectrum NTSC is suitable for a variety of applications, including image databases, training systems, presentations, graphics and desktop publishing. The card reportedly features both live fractional and live multiple zoom capabilities, eight-bit digitizing in real time and 16.8 million colors. It is Video Graphics Array compatible and priced at $2,495.

Redlake
15005 Concord Circle
Morgan Hill, Calif. 95037
408-779-6464

Control Systems, Inc. has introduced a 1,280- by 1,024-pixel graphics controller for the IBM Personal System/2 Models 50, 60, 70 and 80.

The Artist 12 MC board was designed especially for architects, designers and engineers working with high-level computer-aided design, manufacturing and engineering applications, the company said. The product is reportedly available in both 16- and 256-color versions and has a maximum bandwidth of 125 MHz.

The 16-color version is priced at $3,995, and the 256-color configuration costs $5,995.

Control Systems
2675 Patton Road
St. Paul, Minn. 55113
612-631-7800

Boca Research, Inc. has expanded its Micro Channel family of board products by announcing the Bocaram MCA 50Z memory board.

Designed for use with IBM Personal System/2 Models 50, 50Z and 80, the board operates at 10 MHz with zero wait-state, the vendor said. It is reportedly compatible with IBM's 2M-byte 80286 Memory Expansion Option adapter.

The zero memory configuration sells for $245; the 2M-byte version costs $995.

Boca Research
6401 Congress Ave.
Boca Raton, Fla. 33487
407-997-6227

DATA STREAM

Elisabeth Horwitt

I want my TCP/IP

To a lot of users, OSI is the proverbial lumpy camel put together by an unwieldy committee of rivals under duress — as compared with that good, solid workhorse of a protocol, TCP/IP.

The National Science Foundation (NSF) recently put together a high-speed T1 backbone called NSFnet to connect academic, government and military research groups with supercomputer centers around the country.

It is all based on Transmission Control Protocol/Internet Protocol (TCP/IP) and is likely to remain so, even when the Government Open Systems Interconnect Profile (GOSIP) mandate for OSI migration goes into effect in 1992, according Steven Wolff, NSF's director of networking.

Oh, sure, it will eventually support OSI packets too and provide gateways between TCP/IP and OSI systems. But a lot of NSFnet users like TCP/IP and have serious reservations about OSI. "GOSIP says we have to support OSI, not use it," Wolff says.

The more research studies I

Continued on page 49

Grumbling grows over ONA

ANALYSIS

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Corporate users are becoming increasingly disenchanted with the Federal Communications Commission's Open Network Architecture (ONA) program as it moves from theory to practice.

The dissatisfaction was apparent in the latest round of comments on the regional Bell holding companies' ONA plans, which were amended May 19 under orders from the FCC. User groups such as the Coalition of ONA Parties (CONAP) argued that ONA is not turning out to be very "open" at all and may not be useful in corporate networks until the next century.

Under ONA, a concept the FCC adopted in 1986, local-exchange carriers must provide competing information service providers and users with equal access to basic, unbundled elements of the local telephone network.

Corporate network managers thought they would get an "a la carte" menu of local telecommunications services from which they could select basic service elements to be incorporated into virtual private networks or specialized financial networks. However, that notion was dashed when the FCC, in a December 1988 ruling [CW, Nov. 21], approved an ONA model that allows the former Bell operating companies to bundle switching, access and transport services, at least initially. Users were hoping to buy the local transport services they need without having to pay for unneeded switching.

User groups argued unsuccessfully that the Bell companies' ONA model does not constitute true unbundling and, in some cases, results in greater bundling than exists today. The FCC sided with the Bell companies, who said that further unbundling is not technically feasible now.

After that major defeat, some user groups appeared dejected. CONAP suggested that commenting on the amended ONA plans was a waste of resources because the plans are so fundamentally flawed.

CONAP, a coalition that includes the Ad Hoc Telecommunications Users Committee, said the FCC should now concentrate on ensuring that the Bell companies move quickly to an architecture called Intelligent Network II, which may be the only hope for a truly open network, sometime around the year 2001.

The ONA Users Group, which includes the Committee of Corporate Telecommunications Users, was also distressed that none of the ONA plans describe how the ONA model will evolve to permit further unbundling.

"The Commission must not permit the [regional Bell holding companies] to fit new technologies into the static model that exists today," the ONA Users Group said.

Furthermore, the user groups complained that the Bell companies, with the exception of

Continued on page 46

Unfulfilled dreams

None of the four user-requested services will be offered by all seven regional Bell holding companies in the latest plans for ONA

User requests	Revised ONA plans
User access to carriers' operations support systems for network management	Ameritech, Bell Atlantic, Bellsouth announced 1990 trials; other carriers studying it
Automatic number identification for security purposes	Southwestern Bell working on interim system to make calling numbers available; others waiting for Signalling System 7
Data-over-voice service prior to ISDN implementation	Nynex to offer service; Bellsouth delayed by development problems
Gateways for information services provided to customers	Most carriers to provide billing information, but only US West to offer easy access

SOURCE: TELECOMMUNICATIONS CONSULTING GROUP, INC.

CW CHART: DOREEN DAHLE

AT&T goes round one more time

BY PATRICIA KEEFE
CW STAFF

NEW YORK — AT&T's latest bid to grab a piece of the desktop has sent it back to its roots — networking and, of course, Unix.

AT&T recently unwrapped an Intel Corp. 80386-based family of desktop computers and file servers reportedly "optimized" for scalable, distributed networking. It has also adjusted its sights toward vertical markets and systems integration.

"We recognize that computer buying decisions are becoming more closely linked to network decisions," AT&T Group Executive Robert Kavner said.

Analysts say the pricing is good and the strategy sound, but neither is particularly novel. "Every vendor is making the same pitch," said Maggie Konner, an analyst at International Data Corp. in Framingham, Mass. "Customers have rats' nests, and they need help integrating all this stuff."

Many analysts maintain that

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Inside

- ISDN may be added to federal protocols. Page 46.
- Vendor group rallies behind FDDI standard. Page 47.
- U.S. Navy court-martials twisted-pair cables. Page 48.

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ONA

CONTINUED FROM PAGE 45

Ameritech, will not limit the price of their basic service elements to the cost of service. The International Communications Association (ICA) called the pricing situation "patently absurd" because the Bell companies have monopoly control over the local-exchange network.

By simply inflating the price of basic service elements, the Bell companies can increase the revenue from their regulated services and boost the costs of competing information service providers, the ICA said.

All three user groups urged the FCC to reject the amended plans because they offer only minor improvements over the original plans, which users had derided as "a waste of good trees."

One small improvement, users said, was that the seven regional Bell holding companies achieved more uniformity in their nomenclature for similar services. However, users still fear that the availability of ONA services and the technical interfaces will be dissimilar among the seven regions.

The ONA Users Group said none of the seven plans offers all of the major services sought by large users — namely, network management capability, calling-number identification, data-over-voice transport and gateways.

For example, the group praised Nynex Corp. for offering data-over-voice service but wondered why the other Bell companies could not offer it.

Electronic Data Systems Corp. (EDS) complained in its filing that only three of the Bell holding companies will offer network monitoring and diagnostic services as a basic service element on a nondiscriminatory basis.

EDS said it is crucial for users to have real-time access to the carriers' systems for network management. Furthermore, EDS said, there must be some technical uniformity in the services; otherwise, network managers may be forced to have a different workstation to monitor each of the Bell carriers.

Because there are "bright spots in each of the plans," the ONA Users Group said, the FCC should require all of the Bell companies to adopt the best elements of each plan as a "highest common denominator."

The user groups also expressed dismay that the Bell companies, and apparently the FCC, are relying on the Information Industry Liaison Commitee (IILC) to solve a host of unresolved technical issues.

"The [Bell companies] cite the IILC as the vehicle for effecting uniformity, yet this forum is destined to move at a snail's pace given its cumbersome, overly bureaucratic organization and procedures," the ICA commented.

Likewise, the ONA Users Group said the IILC has "proved to be an unwieldy and largely ineffective forum, particularly in the area of uniformity."

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ISDN to join federal ranks

BY MITCH BETTS
CW STAFF

GAITHERSBURG, Md. — The National Institute of Standards and Technology (NIST) plans to add the Integrated Services Digital Network (ISDN) standard to the suite of protocols that federal agencies will specify for wide-area computer networks in the 1990s.

High-speed ISDN data transport is one of several proposed additions to the institute's Government Open Systems Interconnection Profile (GOSIP). In a July 13 Federal Register announcement, the institute said that GOSIP Version 2 will include ISDN, Virtual Terminal Service and Office Document Architecture standards.

The practical effect of the proposal is that, beginning in the early 1990s, federal agencies will require public data communications vendors to support ISDN as well as the slower X.25 standard included in GOSIP Version 1. ISDN transmits data at 64K bit/sec., compared with 9.6K bit/sec. for X.25 packet-switched networks.

Public comments on the Version 2 proposal are due Oct. 11. NIST will then evaluate the comments and publish GOSIP Version 2 as a federal information processing standard.

How well it worked

Whether ISDN is retained in the final standard may hinge on a recent test conducted by AT&T and the U.S. Air Force at Mather Air Force Base in California, according to Gerard F. Mulvenna, manager of the network applications group at NIST. The 36-hour test was aimed at linking workstations running OSI applications to AT&T switches using ISDN interfaces [CW, July 10].

"I understand they were largely successful in using ISDN as a network technology supporting OSI applications," Mulvenna said.

Once GOSIP Version 2 is published as a federal standard, there will be an 18-month grace period before it becomes a mandatory part of federal contracts, NIST said. The Version 2 timetable does not affect the timetable for Version 1, which was approved Feb. 15 and will become mandatory after Aug. 15, 1990.

Mulvenna said that Version 3 is likely to add the Fiber Distributed Data Interface standard to the GOSIP suite.

FDDI standard gains cheerleaders

BY PATRICIA KEEFE
CW STAFF

SUNNYVALE, Calif. — Yet another standard has spurred the formation of a pep club with a vested interest in cheering it on.

Advanced Micro Devices, Inc. (AMD), developer of the first complete very large-scale integration Fiber Distributed Data Interface (FDDI) chip set, recently organized the Advanced Networking Group (ANG). The group's charter is to promote rapid implementation and acceptance of the FDDI standard.

Much like the Open Token Foundation, ANG hopes to boost its pet standard by fostering multivendor interoperability. The chip maker said it will establish an interoperability test center open to all suppliers of FDDI products and competitive chip sets as they become available.

ANG Chairman Tom Medrek, who is also product marketing manager of AMD's FDDI chip set, said the group is considering twice-a-year interoperability demonstrations, starting within a year, that are open to the public.

ANG's initial goal, however, is to sell FDDI solutions. In addition to a probable ad campaign touting FDDI's claimed benefits, Medrek said the group will attempt to "nail down stuff outside the scope of the standard" such as express transport protocols for Open Systems Interconnect (OSI) layers three and four.

For the first few years, the group may incubate under the protective wing of AMD, which plans to turn the testing center loose in a couple of years after it becomes self-sustaining. "ANG is controlled by us to the extent that we run the meetings and fund a lot of what the group is doing," Medrek said. "We do plan to give committee members a vote in what goes on."

In addition to AMD, the Advanced Networking Group has 37 charter members — only 26 of whom are willing to be identified publicly at this time — that include a broad range of software and hardware vendors.

Medrek would not say whether IBM is a member but did say that the group would be more productive with IBM. "We'd love to have them join," he said.

The standard offers 100M bit/sec. speed over fiber-optic cable. Configured as a ring topology, FDDI supports two active counter-rotating rings, each as long as 100 kilometers, with stations spaced as much as two kilometers apart. AMD's Supernet five-chip set has been shipping in volume since December 1988.

The inaugural meeting was held June 18 in San Jose, Calif., with about 60 people in attendance. The next meeting will be held Aug. 20, the day before the X3T9.5 ANSI-accredited FDDI standards committee meeting.

Where it's at

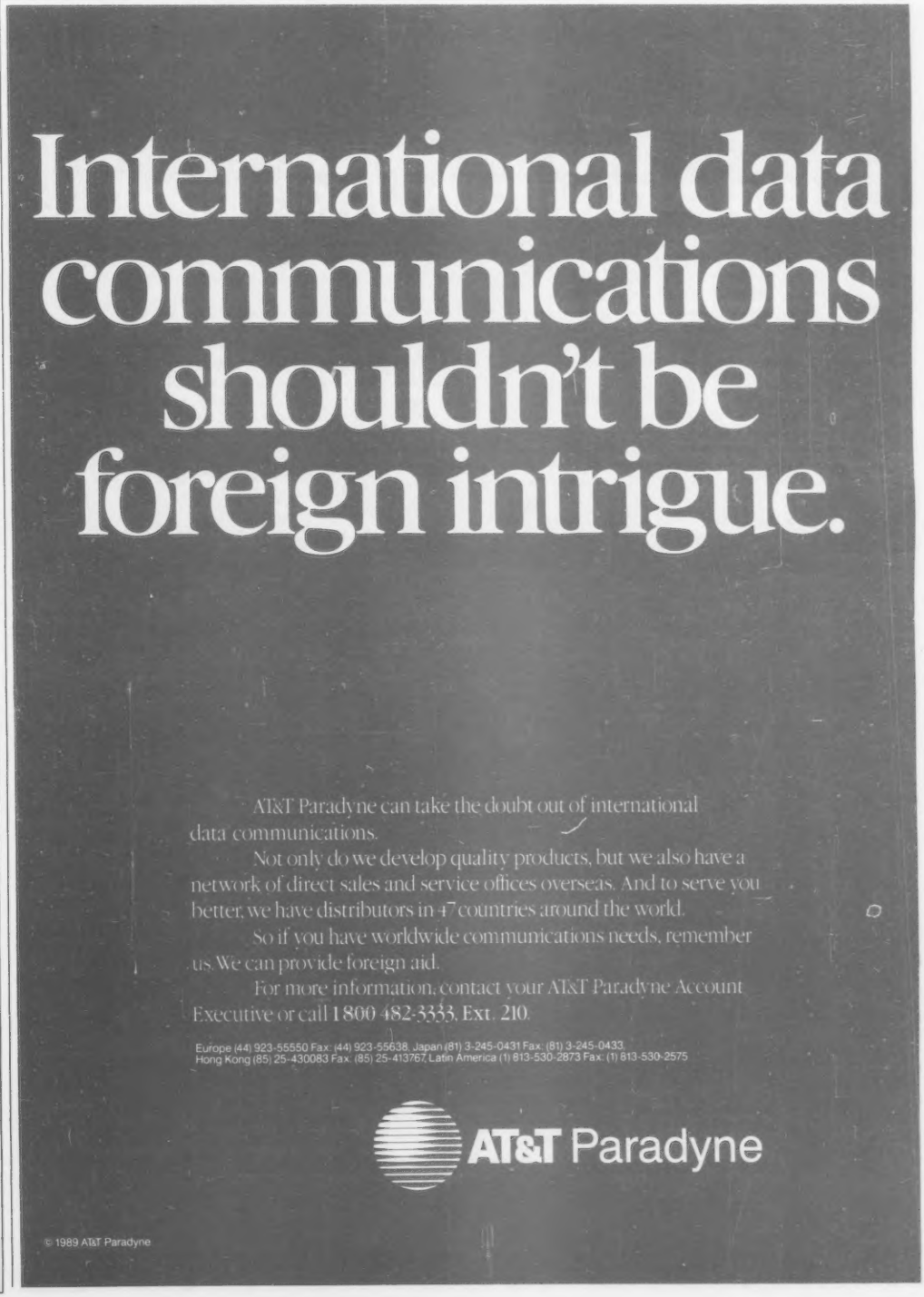
The following is the current status of the emerging FDDI standard, which concerns the two lowest layers of the OSI model:

Established:

- Physical Protocol — A published ANSI and International Standards Organization (ISO) standard.
- Media Access Control — A published ANSI and ISO standard.

Drafted:

- Physical Media Dependent — It is undergoing a second ANSI public review and is an ISO draft international standard.
- Station Management — A draft ANSI standard published in February with finalization expected by year's end. Station Management coordinates the activity of the three other areas within a station, defines bandwidth allocation and fault-isolation methods and manages neighboring physical links.



Broadband Ethernet bails out Navy depot

ON SITE

BY RICHARD PASTORE
CW STAFF

ALAMEDA, Calif. — Torrential downpours are just one of the many hazards the U.S. Navy is expected to contend with while at sea. But it is beyond the call of duty to endure 1940s-era twisted-pair communications links that go down every time it rains.

The Naval Aviation Depot here, a 90-building facility dedicated to repairing and overhauling Navy aircraft, has understandably replaced decades-old, hard-wired, twisted-pair connections — whose underground cable storage area had been plagued by water damage — with a broadband Ethernet local-area network from Ungermann-Bass, Inc.

"Our twisted-pair left a lot to be desired," depot LAN manager Jay Mensch said. "We had caved-in conduits, and every time it rained, the phone system would go out and the computer lines would have trouble. So the broadband LAN was kind of a godsend. It's been doing a fine job for us."

The LAN, fully implemented since last August, spans 42 buildings over a three-mile radius. It links about 800 Zenith Data Systems 248 workstation nodes to a multihost environment consisting of two Tandem Computer, Inc. TXPs, a Digital Equipment Corp. VAX-11/780 and 8530 and a Unisys Corp. 1100 from the former Sperry Corp.

The LAN operates on coaxial cable with both ½- and ¾-in. backbones. The two VAXs function partly as file servers, while two Sun Microsystems, Inc. Sun-2 workstations serve as network control consoles. UB's Net/One network software manages the setup.

In the twisted-pair days, "if you had a need to access all three [host brands], you had to have three different terminals on your desk," each hard-wired to a separate host, Mensch said. "Now, you can use one PC to access any of them through the LAN." The personal computer offers two modes of terminal emulation: VT100 from Tandem and PCT from Zenith.

Talk to me

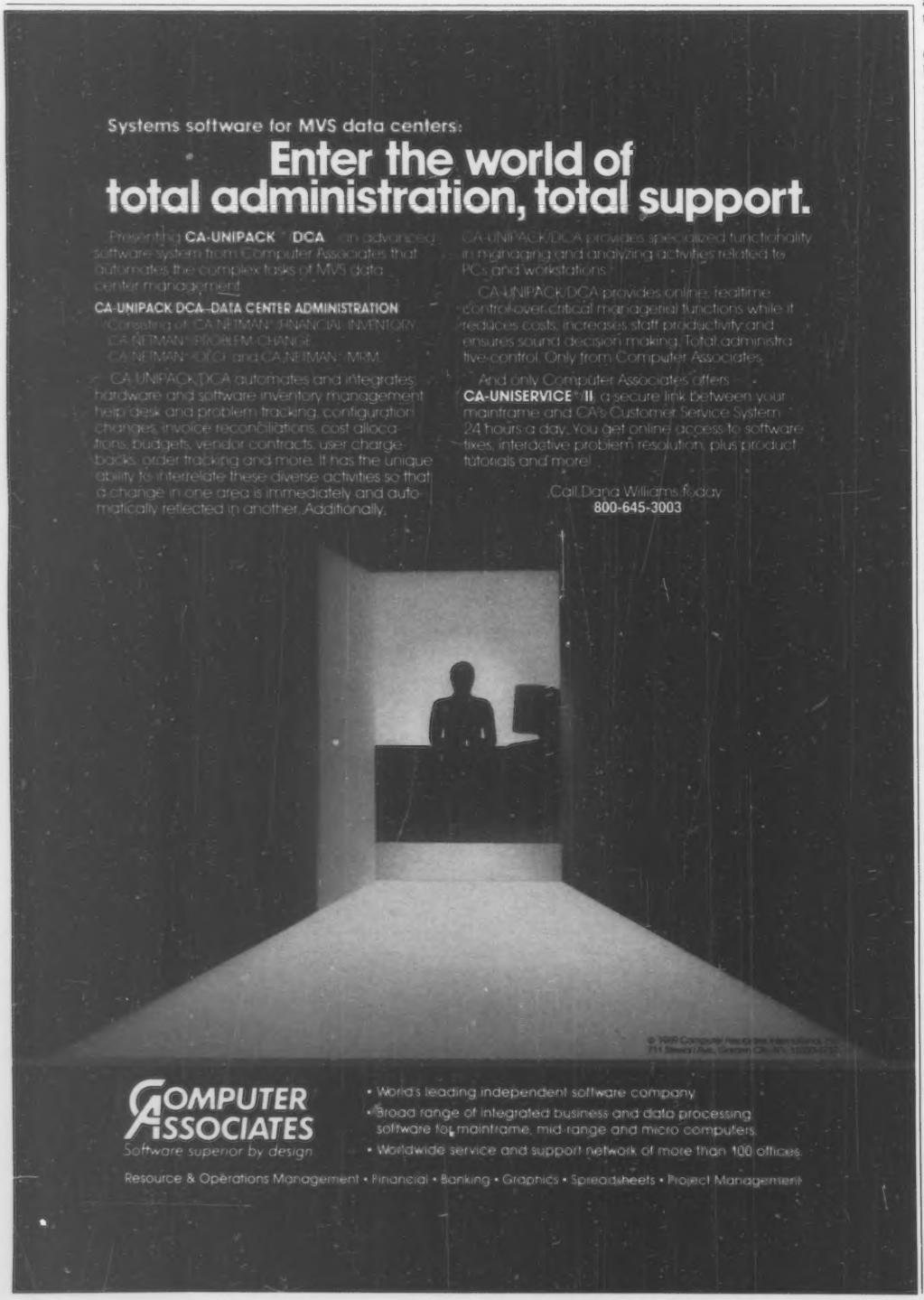
Another benefit of the system, which was designed to last 15 years, is that it allows formerly data-dedicated lines to be used for voice communications, which now run independently from the LAN. "The base can accommodate only so many lines, be they for data or voice communications, and we were really short of them," Mensch said.

With an on-site representative from Allied Data Communications Group, a UB subcontractor, the LAN is saving the naval depot time and money on maintenance calls. In total, the facility expects to save $2 million annually with the new technology.

Work progress tracking is the principal application run on the LAN, Mensch said. Mechanics report on the system as they proceed through a job, and the LAN facilitates the tracking of work progress and job status.

The depot also uses the LAN to order parts from its Oakland, Calif., supply center. The LAN goes through an Ungermann-Bass network interface unit to a splice node and then out over leased lines. The system eases procurement of parts "because it's faster and a little more accurate, since you access the parts inventory database yourself without having to go through two or three [human] go-betweens" as before, Mensch said. Now that the workstations are linked, the depot can benefit from electronic mail and software-sharing, he said.

The depot served as a test site for the LAN, which has since been installed in the five other Navy depots on the East and West Coasts.



Horwitt

FROM PAGE 45

read and the more TCP/IP users I talk to, the less likely it seems that TCP/IP is on the verge of obsolescence or that a mass migration to OSI is in the offing. A recent report by Newton-Evans Research found TCP/IP products and services growing by 21% to 54% per year and predicted that this growth rate range will extend through the next 30 months.

The report also found that user interest in the protocol has extended beyond the government sector to private firms — a key development, because the government has been the major TCP/IP proponent and user. Newton-Evans also surveyed 73 corporations, finding that 61 respondents use TCP/IP and that five more plan to implement the protocol. In contrast, only 45% of respondents had plans to migrate to OSI.

One of the most interesting aspects of the survey was the fact that 54% of respondents said they had a current or prospective need for end users to use OSI applications over a TCP/IP network. This is in line with NSF's strategy: Keep those nifty TCP/IP networking protocols intact, but bring in OSI wherever users need it through application gateways, bridges and the growing number of offerings that allow OSI applications to run on top of lower level TCP/IP protocols.

Why all this TCP/IP fervor? Wolff said he likes the protocol because "they didn't declare it a standard before its time." Standards need to evolve in a natural, Darwinian fashion, after various protocols and technologies battle it out to see which one is the fittest networking solution for specific user needs.

Ideally, they should also get a lot of user input during that evolution. TCP/IP was user-oriented from the first, because it was originally developed for the Department of Defense. During its life span of more than a decade, the protocol has received a lot of user input — including much criticism. In the last few years, vendor working groups have addressed many key user concerns effectively.

For example, users complained that different vendors' implementations of TCP/IP often could not interoperate over interconnected local-area networks. A couple of years ago, several leading TCP/IP vendors got together and ironed out the incompatibilities among their systems.

OSI's creator, in contrast, is the worst possible organization to develop a standard: a standards body. Note that I said develop, not choose. A standards body should evaluate the best technological specifications in the public and private sectors, then give its blessing to whatever protocols best meet user needs. It should not create standards out of vendor politicking, bickering and compromise, the way OSI was largely created.

Given its lineage, it is not surprising that OSI does a lot of things adequately and few things very well or that it is taking forever to become usable.

Indeed, OSI may become obsolete by the time it comes into its own. TCP/IP has had a good, long period of usefulness that should extend through the next few years, by which time OSI should be mature enough to erode TCP/IP's installed base. However, around that time, multimegabit standards such as Fiber Distributed Data Interface, Sonet and broadband Integrated Services Digital Network will start to take off, generating the need for more efficient protocols than either TCP/IP or OSI — low-level protocols, anyway.

The one area I think OSI will be good for is interoperability at the application level — linking multivendor E-mail systems via X.400 and (eventually) network management systems via Common Management Information Protocol/Services. So we'll have the scenario outlined by the NSF and by Newton-Evans: OSI applications running first over TCP/IP and then, perhaps, over a new breed of high-speed low-level protocols.

It could be worse.

Horwitt is a *Computerworld* senior editor, networking.

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DEC offers LAT license program

BY ELISABETH HORWITT
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. recently announced a licensing program for its Local Area Transport (LAT) protocol, saving third-party vendors the trouble of having to reverse-engineer the popular terminal-to-VAX networking specification.

The move reflects the vendor's recent shift in policy toward opening up its protocols. In the case of LAT, this allows non-DEC operating systems, hardware, terminals and communications servers to access VAX hosts and other DEC systems.

DEC was also motivated by a desire to "protect our interests in technological development" by patenting the LAT specifications and charging vendors to use them, said Gail Daniels, director of work group and local-area network marketing at DEC.

More LAT products

Two companies announced LAT-based products just before DEC's patent went through.

Distributed Logic Corp. announced Distributed Terminal Server 1000, a LAT server system that is said to connect between eight and 128 asynchronous terminals to DEC Ethernet networks. The product will support a Transmission Control Protocol/Internet Protocol interface card in the near future, the Anaheim, Calif.-based vendor said.

Available now, the eight-port version costs $3,499, while a 128-line system costs $14,996.

Polygon, Inc. in St. Louis, Miss., announced a product in conjunction with Banyan Systems, Inc., said to integrate Banyan's Virtual Network System, or Vines, with LAT protocols on a personal computer.

Banyan said it participated in the development because nearly 35% of its customers are VAX users.

Polygon's Vines-Network Support Option reportedly allows PCs to communicate simultaneously with a Vines server and a VAX on an Ethernet network and to hot-key between the two. Available now, the option costs $69.

In addition, DEC announced a LAT-based Ethernet server, the Decserver 300, which will supersede the existing Decserver 200/DL. The 300 is said to support 16 asynchronous lines and 33,000 char./sec. total throughput vs. the Model 200/DL's eight lines and 12,000 char./sec. throughput. Also, the Decserver 300 lowers costs to $275 per connection from the Model 200/DL's $380 per connection.

AT&T

FROM PAGE 45

AT&T is still wallowing in catch-up mode, and some question whether the telecommunications giant will be able to successfully woo corporate customers this late in the desktop game.

The Intel PCs, set for shipment in August, have already incurred an external order backlog of 60,000 units, AT&T said.

AT&T clearly believes it has a winning strategy, said Michael Goulde, a director at BIS CAP International, Inc. in Norwell, Mass., noting that AT&T has the money to back its plans. Citing recent contracts with American Airlines and the U.S. Air Force, he suggested that AT&T has a knack of winning 15,000-to 20,000-unit awards. The issue, Goulde said, is whether AT&T has the people — sales, support and middle managers — to implement that strategy. "Can they deliver?" he asked.

AT&T's Kavner *sees buying decisions linked with networks*

The Intel boxes pick up where AT&T's previous 6300 line, supplied by Ing. C. Olivetti & Co., left off. The new entries range from a 16-MHz 386SX personal computer to a 33-MHz tower and cost from $2,995 to $22,225. A series of preconfigured "core" systems and applications range in price from $11,550 to $24,725.

The PCs reportedly will support MS-DOS, Unix and OS/2 clients as well as Unix servers, including AT&T's Unix port of OS/2 LAN Manager, which is slated to ship by year's end.

"We've been telling our clients that servers will be split fairly evenly in the local-area network environment between OS/2 and Unix," said Michael Heylin, an analyst at Creative Strategies Research International, Inc. in Santa Clara, Calif.

Particularly highlighted was a 33-MHz 386 server with a small computer systems interface peripheral. This reportedly will provide users with access to faster drives, greater throughput and much more storage.

Support for AT&T's Unix System V will provide compatibility with industry standards such as Starlan, IBM's Systems Network Architecture, 3270, LU6.2, RJE and X.25.

There are three keys to AT&T's revamped network strategy, said Rick Villars, an analyst at International Data Corp.: Unix, very high-end chips and a new reduced instruction set computing processor [CW, July 24]. Instead of trying to cover all computing bases, AT&T is wisely picking its spots, he added.

The company's strategy will include support for open systems and four shrink-wrapped, customized configurations.

When pressed, Thomas Arnold, AT&T's vice-president of entry systems products marketing and development, admitted that AT&T's new-found perspective is not new. But he insisted none of the other vendors singing the same song have delivered on those promises.

NEW PRODUCTS

Local-area networks

A mainframe data conferencing product for VTAM network users that complies with IBM's Systems Application Architecture/Common User Access (SAA/CUA) interface has been introduced by Candle Corp.

CL/Conference Version 140 for MVS is said to allow VTAM users to share a continuous on-line session, reducing the time and cost of on-line support and training. Features reportedly include a combination of pull-down and pop-up windows to guide the user through the conferencing functions, facilitation of hard-copy generation, ability to customize the program and a network accounting facility.

The price is $10,000 to $20,000, depending on the environment.

Candle
1999 Bundy Drive
Los Angeles, Calif. 90025
213-207-1400

An office management software package for local-area networks has been announced by 21st Century Products, Inc.

Called Office Minder, the package reportedly runs in a DOS environment and includes electronic mail, project management, alarms, resource scheduling and electronic Rolodex functions. According to the company, the product's E-mail system includes a full-featured text editor and is capable of attaching to any DOS file. The package costs $595 per server license.

21st Century
420 E. Grand Ave.
Beloit, Wis. 53511
608-362-1340

Century Software has introduced an IBM AIX version of its Term Communications Software, offering IBM RT users VT220 emulations.

Term V.6.1 is reportedly an asynchronous communications package that runs under multiple operating systems providing the complete Digital Equipment Corp. multinational character set. Said to run under such operating systems as Unix, Xenix, DOS, A/UX, BTOS and VMS, the software is also compatible with more than 100 small- to large-scale computer systems, the company said.

The AIX version of Term sells for $495.

Century Software
Suite C294
5284 South 320 West
Salt Lake City, Utah 84107
801-268-3088

Black Box's *Fiber Optic Mux melds up to four twin-axial lines*

Front ends/ Multiplexers

Black Box Corp. has announced its Fiber Optic Mux, a fiber-optic multiplexer designed for the IBM System/36 and 38, as well as the Application System/400.

The product reportedly allows users to combine as many as four twin-axial lines into one fiber-optic line. The twin-axial mode is suitable for short-run (5,000 ft. and under) applicatons, while the fiber-optic mode is optimal for long-distance transmissions, the vendor said. The unit is priced at $2,295.

Black Box
Box 12800
Mayview Road at Park Drive
Pittsburgh, Pa. 15241
412-746-5500

Pacific Communication Sciences, Inc. has unveiled the Clarity Series 4100 Voice Multiplexer.

The product utilizes proprietary voice-compression algorithms and offers transparency to analog modem signals, according to the vendor. The desktop unit is available in models supporting as many as four voice trunks and a data line in one enclosure and is especially suitable for operation on domestic and international 56K and 64K bit/sec. digital links. Pricing starts at approximately $8,000.

Pacific Communication Sciences
10075 Barnes Canyon Road
San Diego, Calif. 92121
619-535-9500

Western Telematic, Inc. has announced a line of multiplexers that reportedly allow as many as eight asynchronous devices to simultaneously communicate at speeds up to 9.6K bit/sec.

The DM-41 four-port unit and the DM-81 eight-port model can transmit over distances up to 3,000 feet using inexpensive twisted-pair telephone wire or existing cable, the vendor said. The DM-41 is priced at $295, and the DM-81 configuration costs $495.

Western Telematic
5 Sterling
Irvine, Calif. 92718
714-586-9950

Network management

Racal-Milgo, Inc. has extended its Sunrise strategy for full-service network management with the introduction of the Communications Management Series (CMS) 4000.

The CMS 4000 family is based on the Unix operations system and incorporates Oracle Corp.'s Oracle database management system, according to the company. The first release in the series is the CMS 4500, reportedly capable of supporting large networks with as many as 512 diagnostic channels and 8,190 devices. Scheduled for volume shipment in the first quarter of 1990, the system will be priced from $200,000 to $300,000.

Racal-Milgo
1601 N. Harrison Pkwy.
Sunrise, Fla. 33323
305-475-1601

Gateways/ Bridges/Routers

Network Resources Corp. has announced the NRC 2000 family of Apple Computer, Inc. Appletalk-compatible routers for broadband, Ethernet and fiber-optic networks.

The products reportedly permit geographically dispersed Apple Macintosh computer networks to be built using existing backbone networks and software.

The series includes the AT2000 for connecting one Appletalk device to the backbone network; the AT2002 for connecting up to two Appletalk devices; and the LT2000 for attaching devices on a Localtalk or Phonenet local-area network to the backbone. Pricing ranges from $999 to $1,995.

Network Resources
2450 Autumnvale Drive
San Jose, Calif. 95131
408-263-8100

Microcom, Inc. has announced a family of remote local-area network bridges designed to establish connections between Token-Ring or Ethernet local-area networks, the company said.

The MLB/5000 series of dial-up bridges and the MLB/6000 series of private-line bridges are reportedly capable of connecting multiple LANs to form a single logical network. Each model may be ordered as a turnkey system, including an IBM Personal Computer AT platform, or as a component kit that may be installed in certified compatibles. Pricing ranges from $4,599 to $13,199.

Microcom
500 River Ridge Drive
Norwood, Mass. 02062
617-551-1000

Local-area networking hardware

Interlan, Inc. has introduced an IEEE 802.3 multiport repeater that reportedly combines up to 10 segments into a single virtual local-area network.

According to the company, 10 segments of thin Ethernet or a combination of eight thin Ethernet and two standard Ethernet or fiber segments can be integrated by the multiport repeater. The unit reportedly retimes packets, regenerates preambles, extends fragmented packets, preserves collision integrity and automatically partitions defective network segments.

The list price is set at $2,495.

Interlan
155 Swanson Road
Boxboro, Mass. 01719
508-263-9929

Asante Technologies, Inc. has introduced a Token-Ring network interface card for the Apple Computer, Inc. Macintosh.

The Maccon II/TR reportedly allows users to connect Macintosh IIs, IIXs and IICs to a Token-Ring network. The card is usable in a workstation environment or as an Appleshare file server.

The Maccon II/TR complies with the IEEE 802.5 Token-Passing Protocol Standard and operates at a rate of 4M bit/sec., the vendor said.

Available in the third quarter, the card sells for $695, according to the company.

Asante Technologies
Suite G
1050 E. Duane Ave.
Sunnyvale, Calif. 94086
408-736-3360

Links

Data Switch Corp. has announced the Model 9390, a channel extender that enables IBM 3090 and compatible computers to communicate with disk-storage devices at distances up to 1,300 ft.

The channel extender reportedly is able to connect 3090 mainframes with IBM 3990 Models 1 and 2 as well as IBM 3380 Model CJ2 direct-access storage device control units. Dual load-sharing power supplies ensure uninterrrupted operation, according to the company.

Available for purchase now, the product sells for $19,800. A rental option is offered for $895 per month for a minimum of three months.

Data Switch
One Enterprise Drive
Shelton, Conn. 06484
203-926-1801

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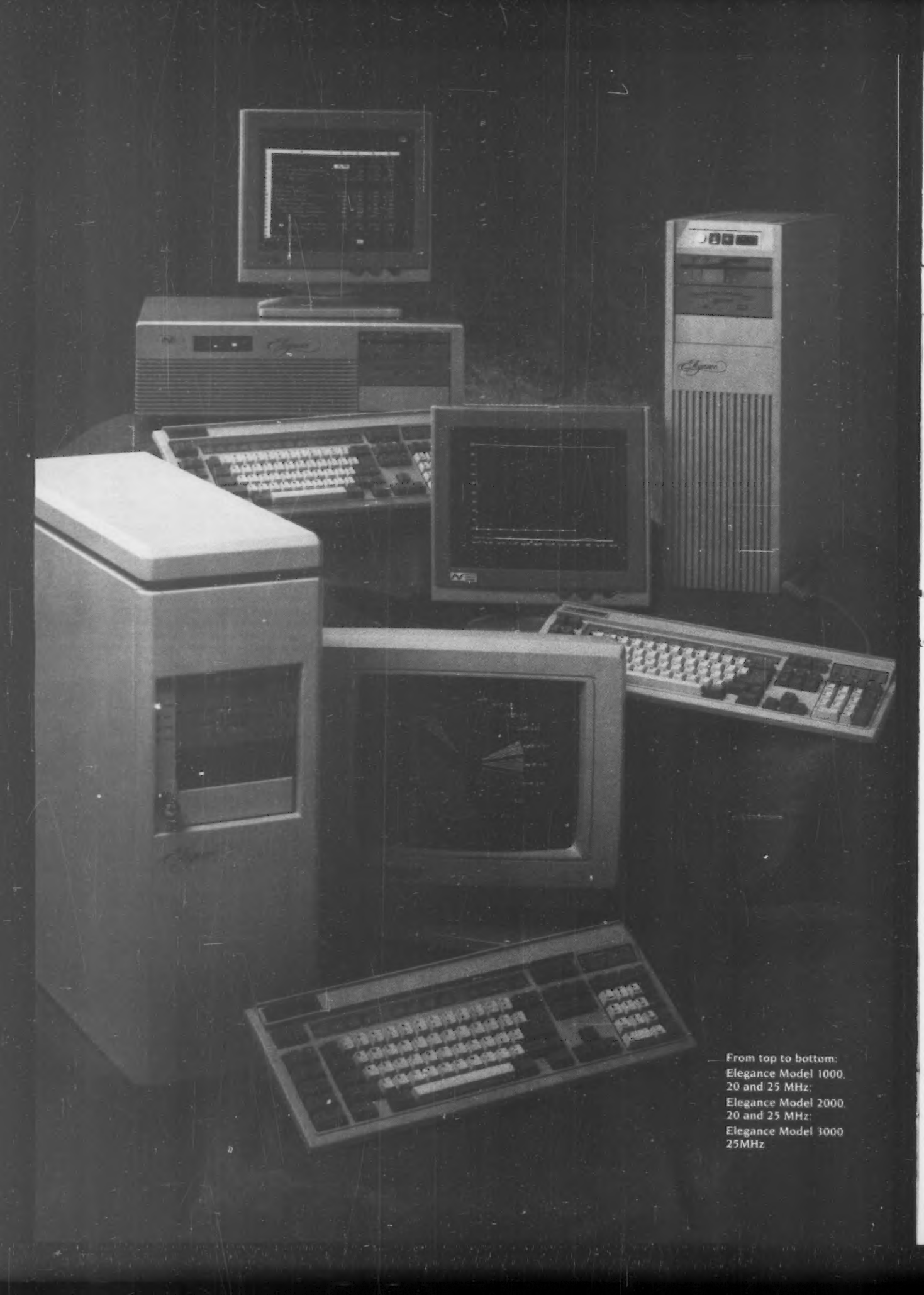

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MANAGER'S JOURNAL

EXECUTIVE TRACK

Kenneth R. Frayer has been promoted to vice-president of information systems at **Prudential-LMI Commercial Insurance Co.** in Mansfield, Ohio.

Frayer joined Prudential Property and Casualty Insurance Co. in 1980 as director of information management and was named assistant vice-president of systems and programming in 1984. He left the firm in August 1986 but returned as director of systems and programming in 1987 after Prudential acquired Lumbermens Mutual Insurance Co. to form Prudential-LMI.

Frayer holds a bachelor's degree in manpower and industrial relations from Ohio State University. He is a past president of the North Central Ohio chapter of the Data Processing Management Association.

Janet L. Callier has been appointed manager, information center and telecommunications, at **Arkwright Mutual Insurance Co.** in Waltham, Mass.

Callier has been Arkwright's manager of telecommunications since 1986 and was named assistant vice-president in 1988. She joined the supplier of risk management services in 1982 as computer services unit manager. Callier also held data processing positions at Kay Windsor in North Dartmouth, Mass., and Collier Wire in Lincoln, R.I.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor-Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Seizing the day at Pratt & Whitney

VP jumps in during time of trouble and steers staff, firm to better mind-set

BY DOUGLAS BARNEY
CW STAFF

PROFILE: Doug Lewis

Position: *Vice-president of MIS, United Technologies Corp.'s Pratt & Whitney subsidiary*
Mission: *Increase IS flexibility by reshaping attitudes, broadening personal computer use and cutting costs and development time*

Most people who implement layoffs and radical organizational restructurings are not popular, at least with those affected by change. But Doug Lewis, vice-president of MIS at United Technologies Corp.'s Pratt & Whitney jet engine subsidiary, is by all accounts a popular fellow.

Lewis has been called a breath of fresh air by both personal computer-oriented staffers and the more traditional mainframe lords. The key for this 45-year-old native Texan has been to convince most of his information systems staffers that change is not only desirable but that it lies at the very core of Pratt & Whitney's survival.

Like many firms that dominate a field, Pratt & Whitney had grown complacent. For a long time, it was simply untouchable in the jet engine business.

Then top competitor General Electric Co. picked up steam and began to get military and commercial contracts that used to fall into Pratt & Whitney's lap.

By 1985, the East Hartford, Conn.-based firm was in trouble. The most poignant example of Pratt & Whitney's fall came in March 1988 when its own corporate Boeing 727 was sold to hotel magnate Leona Helmsley as a cost-cutting measure.

Why would anyone in their right mind join a company in such a slump? For Lewis, the answer was quite simple: the chance to play a pivotal role in lifting Pratt's fortunes. "I had an opportunity to help turn Pratt around," Lewis says.

Lewis joined the firm in May 1988 after 22 years with General Dynamics Corp. His mandate was clear: cut

Continued on page 58

Foreign spending doesn't cinch global view

BY ALAN J. RYAN
CW STAFF

Many U.S. companies continue to invest billions of dollars in European and Asian business but still do not exhibit more than a few global characteristics.

At least that is what two Nolan, Norton & Co. researchers, John L. Daniels and N. Caroline Frost, claim in their recent paper, "On Becoming a Global Corporation." In the article, Daniels and Frost, staffers at the Lexington, Mass.-based information systems consultancy, claim that progress is slow because companies just do not understand the whole concept of globalization.

Many companies, the authors said, confuse the term "global" with "multinational," "multidomestic" or "worldwide." In fact, they said, global is a concept on *how* to conduct business rather than *where* to do it.

A global company has a sphere of activity and awareness that stretches beyond where it operates to where it earns revenue, sources and carries out activities or has a relationship with an outside party, the authors said.

Companies that want to become global and remain competitive, they said, need to invest in the technology to connect their businesses. "The communication infrastructure and knowledge management approaches must be in place so that there can be timely access to relevant information, regardless of where one is located," they said.

However, the authors said, "well-designed local systems are not necessarily readily transferrable to other geographic locations."

Global variations must be considered in the design phase of potential global systems. Systems designed for one country often lose functionality and quality when used elsewhere. Instead, the authors said, companies would be wise to plan for a system that has just 20% in common with other systems in the global network and expect to customize 80% of the system for each location.

The global architecture moves away from a geographic concept and focuses on the business concept and flow, they said. By forcing individual sites to look at problems from multifunctional perspectives, IS can build the business capability and provide consistency while simultaneously supporting localized look-and-feel interfaces. In turn, this enables the company to leverage resources and connect for global advantage.

Pratt & Whitney

CONTINUED FROM PAGE 57

costs, increase IS responsiveness and slash the time it takes to develop applications, all at once. Lewis is about one year into his three-year plan and, based on moves made so far, is well on his way. And Pratt & Whitney has indeed turned around. After its sales increased only 5% between 1984 and 1987, Pratt & Whitney logged a 10% sales jump in 1988.

Using the same resolve that used to propel him during 100-mile bicycle rides, Lewis has already consolidated the firm's four data centers into two logical units. As part of that effort, 52 people lost their jobs. Under a previous corporatewide cost-cutting program, 137 IS employees were let go. Some 1,600 IS employees remain worldwide.

Lewis has also made organizational changes, including moving supervisors into more hands-on roles, placing IS professionals in non-IS jobs and integrating the PC group with mainstream IS. Lewis also gained control over the firm's telephone systems.

Lewis has clearly made peace with Pratt & Whitney's PC users, shortening what used to be a year-long approval cycle for PC-related acquisitions. Users "used to have to swing from the rafters for three days naked, screaming that they swear they are going to use it for something good, and then they were considered," says Ron Goldfarb, manager of new technology. "We had someone who died before their software came in." Now, with a preapproval process, IS can respond to requests in a week, Lewis says.

That is a lot of change, but the biggest challenge is changing people's attitudes, Lewis says. For example, PC maven Goldfarb never really mingled with mainstream IS, viewing the organization as lethargic and slow to innovate.

Shield of armor

The MIS group was not enamored of Goldfarb, either. "Ron had been pretty much abhorred by the MIS organization because he was doing all these wild things," Lewis explains. Now, Goldfarb is a member of the very organization he snubbed.

"I think Ron's attitude of being responsive, proactive and quick are all things I want this new organization to reflect," Lewis says.

One veteran Pratt & Whitney IS professional welcomes the changes that Lewis has brought and looks forward to implementing the rest of Lewis' agenda. When the data centers were separately managed, they "only gave lip service to commonality," says the employee, who asked not to be identified. "Doug's responsibility was clearer."

Now, data centers no longer have separate management hierarchies and are based instead on a single vision of what IS should be. Not only have costs been reduced, but newly installed systems are designed with an overall networking architecture in mind.

One of Lewis' most important management precepts is to let employees know what is going on. On a regular basis, Lewis invites all IS employees to a very large auditorium, where he simply answers questions. This type of openness helps allay fears and suspicions and makes change easier to swallow.

More like us

Lewis is also trying to change the type of IS people that Pratt & Whitney recruits. Rather than scooping mainly computer science graduates, Lewis is looking for people versed in subjects closer to the end user.

"It is easier to train an engineer in computer science. It is almost impossible to train a computer science person to understand mechanical engineering," he says. Lewis is himself trained as a engineer, with an undergraduate degree in electrical engineering and a master's in systems engineering.

Lewis is also a shining example of the new breed of IS managers who view themselves more as strategists and businessmen than technologists. Although he had designed computers for jet airplanes and done binary programming at General Dynamics, Lewis has no computer at home.

"If you view yourself as an MIS person, you get wrapped up in the technology and the IBM-ese, and the customer begins to be an opponent," Lewis says.

With $7 billion worth of new orders since last fall, Pratt & Whitney is getting back on track. Filling those orders at a profit will be the tough part. To beat out the competition, Pratt agreed to cut prices of its jet engines by 30%. If costs do not come down at the same rate, these engines will be sold at a loss.

That makes reducing IS expenses all the more critical, but the data center consolidation should do more than cut costs. It should also result in more harmonious computer systems. This situation did not go unnoticed by Pratt & Whitney executives, who used electronic mail systems that did not talk to one another easily, found that documents could not be transferred from one office to another without re-entering and became aware of computer-aided design and manufacturing systems that did not talk to one another, Lewis says. With a single version of IBM's Professional Office System, they do now.

In little more than a year, Lewis has accomplished a lot, but there is much more to be done. The pressure remains, and Lewis, more than anyone, knows that he had better succeed. "If we don't accomplish our business goals," he says, "then Pratt is going to be in deep yogurt."

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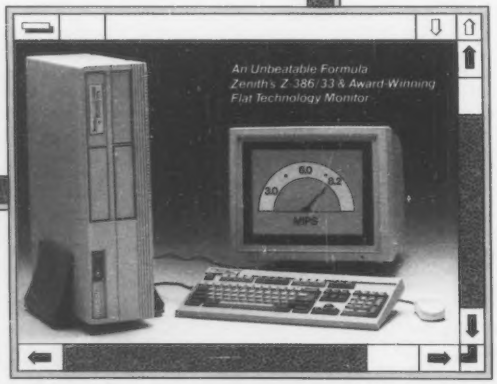

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The call of greener pastures

BY ALAN J. RYAN
CW STAFF

With pockets of technical shortages in the information systems area already surfacing and more pronounced general shortages projected for the 1990s, companies are beginning to take a hard look at their IS attrition rates and seeking ways to curb them.

Tom D. Plant *says that money is secondary factor*

"Companies are very concerned that the stream of talented people in the computer science field is really slowing down," said Christine Bullen, assistant director of the Center for Information Systems Research at the Sloan School of Management at MIT, which gathers information on work trends from 25 major national and worldwide corporations. "They are seeing fewer people coming out of school with a degree and with the kind of training they need."

Bullen said that at some high schools, counselors have discouraged students from entering IS because they believe there is a glut of workers, which she said is simply not true. Instead, she said, the demand for workers with information technology skills is increasing — in all fields — and the pool of qualified people is diminishing.

Still, there are workers to be found, and they can become part of a stable staff if they are managed properly, according to IS executives and recruiters. The most frequently cited problem those new hires will face is poor management.

According to IS career placement specialists, the inability of management to provide workers with a clear sense of career growth and/or the unwillingness to let workers know they are valued are often the factors that drive workers to consider other job possibilities. The complaints may not be new, but today some companies are making more of an effort to listen.

"The [IS] business is evolving from what was a trade to a real profession. There are more workers with undergraduate and graduate degrees, and they are choosing their career paths carefully, as opposed to 'where can I make the most money?' " said Steve McMahan, managing director of career consultants Source EDP's Boston office.

For that very reason, workers want to settle in at companies at which they will be noticed. Companies are becoming more aggressive about trying to reduce turnover, McMahan said, because the cost is astronomical both financially and in terms of productivity.

"People know they can move easily with the skills they have," Bullen explained. "That makes many companies focus on trying to be a better place to work." The average time a worker stays at a job, estimated to be between 18 months and three years by companies and consultants interviewed for this article, is still high.

Workers migrate for a variety of reasons, but a strong management team can help slow the revolving door, interviewees agreed.

At Transco Energy Co. in Houston, for instance, Vice-President and Chief Information Officer Susan Chism Mackie said the turnover rate is low because management is willing to recognize the value of each employee with both financial incentives and encouragement. Top workers are not left to handle routine or tedious maintenance jobs for completed projects, Chism Mackie said, and all workers are encouraged to step beyond their jobs to learn the actual business of the firm.

However, with 80% of all IS workers either willing to consider a change or actively looking, according to Source EDP's 1988 annual national survey of thousands who work in the field, most companies are probably still not doing enough.

"We wouldn't be in business if these managers took the time to show their employees how much they are valued," said Brian D. Leary, an IS placement specialist at Robert Kleven and Co., human resources management consultants in Lexington, Mass.

Throwing money at a problem is not necessarily a solution, either. "Money is one of the last things that causes people to make a change," said Tom D. Plant, vice-president of information technology at James River Corp. in Richmond, Va. Plant said he has conducted informal research during his years as a manager and has found that money is nearly always a secondary factor to other considerations for job changes.

Poor relationships with management can also push people out the door when they become bored or frustrated with their jobs. "I get [job] candidates who say they aren't being technically challenged" in their careers because they are doing systems maintenance rather than designing systems and applications, Leary said. However, the workers look for new jobs rather than confront the boss.

At General Electric Co., however, there is a conscious effort to retain top-notch employees. Those seeking a job change are encouraged to consider other positions — even within different functional areas — in GE's vast network, said Bob Matthews, manager of professional and management development. The frequency with which systems workers make job shifts also can make hiring difficult. With constant openings to be filled, some companies feel forced to lessen their standards and hire people who do not have proper training. However, unless that training can be provided, it only begins a cycle of hirings, firings and rehirings, according to Richard Bell, who works in recruiting at the Arthur Young Management Consulting Group.

Human resources departments are also becoming more involved with workers who are leaving the company, Leary said. "Companies are spending a lot more time on the exit interview trying to get the worker to really come clean," he said. The result is, more companies and departments are holding "rah-rah" type meetings in which the workers are praised in groups or individually, and talk often touches on how the grass is not really greener at another company, he said.

Reasons why systems workers look for new jobs

Money ranks last on this list of motivating factors

1	Unclear vision of career path or lack of career growth
2	Poor relationship with superior
3	Overpromised expectations or overcommitted situation
4	Company problems
5	Obsolete technology
6	Promotion passover
7	Intracompany personality conflicts
8	Long commute
9	Money

SOURCE: SOURCE EDP CW CHART: JOHN YORK

Oltman nabs Andersen post

CHICAGO — Andersen Consulting named John R. Oltman head of its worldwide systems integration practice last week. F. Dean Taylor will fill Oltman's former post, moving up from deputy managing partner to managing partner of the Chicago-based consulting group.

Oltman, 44, will have broad responsibilities in the job, which is an essentially new title at Andersen's 16,000-person worldwide consulting group. Among other duties, he will manage the company's integration and technology centers and develop a "facilities management presence," according to Andersen.

A member of Arthur Andersen Worldwide Organization's Board of Partners and Andersen Consulting's Income and Investment Committees, Oltman joined Arthur Andersen & Co. in 1970 and became a partner in 1980. He holds a bachelor of science degree from the University of Illinois and an MBA from Northwestern University.

Taylor, 55, will direct a staff of 1,600 in Chicago, Andersen Consulting's largest local practice. He also will serve on the firm's North American Operations Committee and oversee activities in Omaha and Indianapolis.

CALENDAR

"Downsizing Mainframe Systems: Coping with Decentralized Systems" will be the theme of a two-day seminar sponsored by Digital Consulting, Inc.

The program, to be held Sept. 7-8 in Boston, will offer users the opportunity to learn how to effectively develop decentralized information systems and leverage end-user experience, make use of specific software tools and reduce software development costs as microcomputer-based systems become a more critical component of the overall corporate IS portfolio.

Other topics will include ensuring timely development and dependability, providing a working framework for managers, analysts, programmers and developers and integrating new technologies and methodologies to help develop distributed IS that meets the needs of management and business users.

For more information, contact Digital Consulting, 6 Windsor St., Andover, Mass. 01810.

AUG. 6-12

International DB2 User Group Conference. Chicago, Aug. 6-9 — Contact: IDUG, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Executive Communications and Support. Wellesley, Mass., Aug. 6-9 — Contact: The Institute of Management Sciences, 290 Westminster St., Providence, R.I. 02903.

Urban and Regional Information Systems Association (URISA) Annual Conference. Boston, Aug. 6-10 — Contact: URISA, 319 C St., S.E., Washington, D.C. 20003.

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First International Congress of EDI Users. Vancouver, B.C., Canada, Aug. 9-11 — Contact: The Electronic Data Interchange Association, Suite 550, 225 Reinekers Lane, Alexandria, Va. 22314.

Speakeasy Conference. Chicago, Aug. 9-11 — Contact: Speakeasy Computing Corp., 222 W. Adams St., Chicago, Ill. 60606.

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The connectivity audit

Or, how to keep your networks — and users — from running wild

BY LARRY DeBOEVER

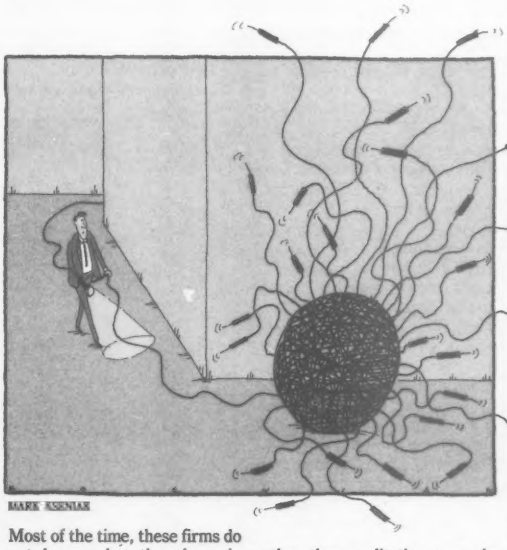
Most information systems managers would cite the full interconnection of all of their corporation's computer assets as a strategic objective of their firm. Insurance companies, financial institutions, airlines, utilities and others, large and small, share this objective.

And when IS managers, network managers and systems developers decide to interconnect fully, they all ask essentially the same question: What do we do first? If they have started to interconnect, which most of them have, then the question is, what do we do next?

Other IS shops have full interconnection efforts under way and may even have completed the network but, for some reason, are disappointed with the results or are unsure of where to turn for greater return on investment or, more generally, greater leverage.

The solutions to these problems do not always come easy. But there is a common set of general themes and specific tasks that are consistent across all of these situations. These concerns are common to large, complex companies with large, complex networks, as well as to midsize companies with fewer than 1,000 computer users. They are common to firms that are just embarking on connectivity as well as those that have achieved full interconnection.

DeBoever is founder of DeBoever & Associates, an interconnectivity consultancy. The connectivity audit was developed in conjunction with Tucker Network Technologies, Inc., a systems integration consulting firm in South Norwalk, Conn.



MARK ASENIAK

Most of the time, these firms do not know what they have in terms of network equipment.

How will you implement new connectivity solutions if you do not understand where you are today? You should first thoroughly identify and evaluate your current information exchange infrastructure (IEI), as well as user requirements that are not met by your existing IEI. This is a connectivity audit.

IS can use the information gathered during this new process to gauge network performance and to estimate the impact of changes made to the IEI on performance. The information is critical to strategic network management. A connectivity audit consists of six separate audits, which together produce an inventory of the existing IEI (see chart next page). The word "audit" is used to emphasize rigor and accountability rather than a strictly financial focus — although return on investment, usually difficult to measure in other than qualitative ways, is certainly one output of the process.

The connectivity audit should be done on an enterprisewide basis, although it can be narrowed to a specific division or even a department and might first be implemented on a pilot basis in that way. The objectives, in any case, are the same.

The inventory that is produced is intended as a baseline inventory of an enterprise's IEI. This knowledge base is analogous to the result of the requirements and data definition steps in systems design; the difference is that this is a connectivity definition. Once completed, the inventory should be continually updated and revised as the existing infrastructure and requirements evolve.

A comprehensive IEI inventory will be the cornerstone in developing connectivity and systems integration strategies for the enterprise. Before going into how to develop the inventory — the audit process — consider what the results should look like.

The IEI is composed of the following seven elements:

- **Physical networks.** The physical network inventory encompasses the tangible network components of all local- and wide-area networks, dial-up lines, gateways and so on. The physical network inventory has to be described to the lowest level of detail — for example, as nitty-gritty as it may seem, you will need to know which personal computer coaxial cards are located in which PCs connected to which IBM 3174 cluster controllers.
- **Network management and user support.** These issues concern ensuring that users have access to networks, that the users who do access the networks are authorized and that authorized users receive the support necessary to take advantage of the networks' assets. This support includes network management software, security systems, network operations staff and the staff and services that support users — Help desks, training and so on.
- **Network services.** The network services portion of the IEI includes those facilities that are made available to all users of a network, including virtual terminal support, message handling, routing facilities and so on. These services are usually provided by the network vendor.
- **Applications systems.** These are divided into two groups — applications that provide information access and exchange between users, such as electronic mail, and production applications that users typically

• Both a physical and a functional inventory

• Getting a grip on end-user computing

• The information exchange infrastructure

use for transaction handling.

• **Information assets.** Information assets are the databases and files available to users on the network. Here, "users" include both end users and other application systems. These include production systems on the host, information center databases and departmental systems, as well as LAN- or server-based assets, which encompass groupware. Also included are data dictionaries or other metadata repositories.

• **User interfaces.** These include both the presentation environment — Microsoft Corp.'s Microsoft Windows, IBM and Microsoft's OS/2 Presentation Manager and so on — and applications developed for that environment to facilitate user access. Examples include scripting tools and network navigation aids.

• **Access and exchange matrix (AEM).** The AEM describes the interrelationships among all of the other components of the IEI. It identifies by user or work group which information assets, application systems and services are being accessed over which physical networks with what type of usage pattern.

The seven components of the IEI constitute the base information exchange infrastructure of an enterprise. Note that neither the organizational nor physical location of the user is emphasized. This is because it is usually more useful to focus on information flow than on the formal reporting structure or the employee's physical location.

For example, organizational charts can be misleading in analyzing information flow. Do you want to know that Personnel downloads data from the order entry system, or do you want to know that John Doe, who happens to be in Personnel, downloads data from the order entry system? You probably want to know about Doe's responsibilities and his position's job requirements.

It may turn out that Doe prepares manpower forecasts tied to order backlog using a spreadsheet model he developed. Doe uses this model to compare manpower and orders with current budgets and historical information. Doe's task could easily be reassigned to finance or strategic planning, but the information flow would, in all likelihood, remain the same. Consequently, it is more effective to view organizational charts as temporary but functional requirements as consistent.

Similarly, physical plant location is less interesting than the network or networks used to access information assets. Which is more important to know? That Doe is located in Philadelphia or that he accesses corporate management via a 56K bit/sec. leased line running IBM's Systems Network Architecture? Certainly the latter, more detailed piece of information is more critical.

Thus, you should try to visualize the work and information flow of a group, the physical network and the work activity over the network first, rather than thinking in terms of an organizational chart or a set of geographically dispersed sites. Organizational charts and locations should be mapped to the IEI you develop, not vice versa.

The audit process

As shown in the chart at right, the following six separate phases of the connectivity audit process generate the IEI inventory:

- Walk-through survey.
- Desktop audit.
- Interconnection audit.
- Information exchange audit.
- Information resource audit.
- Management survey.

In general, these audits should be performed serially by a low-level IS person and build on one another. However, when time is constrained and the organization believes that existing records are relatively accurate and complete, the audits can be performed in parallel. It is not uncommon for one of the audits to require additional work in an earlier stage, or vice versa. In any case, be wary of shortcuts that initially seem advantageous (see story below).

The walk-through survey is a literal tour of the physical plant or plants involved. It should be used to verify existing company records and to make general observations about the location of nodes. The walk-through is particularly useful in identifying user-installed PC LANs, so it entails covering every corridor of every floor of every building. It is best done during nonworking hours to avoid disrupting work in progress. It also serves to give analysts an overall impression of the network skeleton. Obviously, all discrepancies among records and findings should be noted.

The impressions gleaned from the walk-through are in many ways tied to organizational boundaries, a point that may seem to contradict the focus on information and work flow over organizational charts, as prescribed above.

However, the walk-through is one area in which organizational charts and reporting structures can be useful in understanding the degree of IS influence — which, in most organizations, varies from work group to work group.

As a rule, the walk-through also gives the analyst a reasonably accurate gauge of IS' control over end-user computing. If your records are accurate and no unauthorized LANs are identified, then IS probably exerts a healthy level of influence over the user community. Of course, excessively accurate records may also be a symptom of poor policies regarding end-user computing — IS may have an attitude of "just saying no" to users and thereby stifling them. If none of your users are doing anything on their own, they may be under too much IS control.

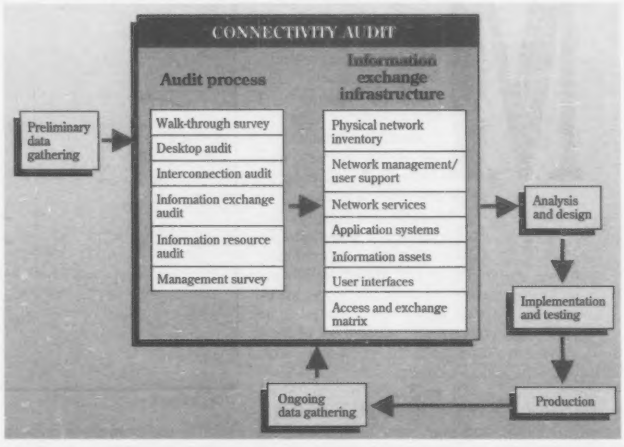
On the other hand, if IS records are completely unusable and there are two or three unauthorized LANs on every floor, you may reasonably assume that IS has very little, if any, influence. Note that unauthorized PC LANs tend to run in bunches; some department managers are more permissive than others.

Another impression that a walk-through provides is the extent to which users outside IS have PCs of the same manufacture and model. If PCs tend to be of the same manufacture, it is usually a sign that users are running similar software. Often, this is because of the influence of a power user in the group, an experienced manager, or both. When you see a wide assortment of PCs, you typically find a wide assortment of incompatible software and a complete lack of control. In such an instance, this area should receive special attention in the desktop audit.

The desktop audit is a physical audit

What and where?

The connectivity audit should occur early in the life cycle of enterprise networking



CW CHART: DOREEN DAHLE

Why what you plan to do may not work

Establishing the initial knowledge base for a connectivity audit requires a great deal of work, but it is well worth the effort. The work, in large part, can be accomplished by relatively low-level staff. While it is very tempting to identify "shortcuts," many of them will not work, so consider the following observations before undertaking them:

• **Observation No. 1:** End users circumvent procurement policies and, consequently, have purchased far more workstations and personal computer local-area networks than information systems personnel ever dreamed about. Do you know of a single case in which a company's inventory records correctly reflect the number and types of PCs purchased by end users? Users have found remarkable ways to circumvent IS and procurement policies ranging from using "taxi vouchers," to entering the wrong property code, to describing the workstation by a functional name rather than as a PC — for example, a "knowledge processing laboratory."

The same is even more true for PC LANs that can be purchased one card at a time, which means that they are often acquired using petty cash.

• **Observation No. 2:** End users transfer host data to PCs in far larger volume than IS, or corporate management, is aware of and often without IS approval. Consider the story of a user in the process of selecting a standard micro-to-mainframe link. After a small "audit," IS discovered that end users had already installed 18 links without IS authorization.

Power users can often help other users replace their terminals with a PC and a coaxial card. Also, rarely can IS fully measure the number of screens transferred by users; instead, they often rely on "connect time," which can be misleading. For example, a user might transfer a file over an IBM 3270 connection that takes 10 minutes of connect time but is actually 120 to 600 separate screens.

• **Observation No. 3:** As implied above, IS is often unaware of the sophistication of power users and the extent to which these users have implemented distributed facilities. Not only can users install micro-to-mainframe links, but some are able to develop relatively sophisticated systems without IS involvement or approval. Security is only one of the many concerns you should have.

• **Observation No. 4:** End users frequently ignore industry standards — as well as internal standards and procedures — when selecting "solutions." This often results in the purchase of nonstandard PCs, software, memory, disk drives and so on. The issues of support and maintenance immediately come to mind, and it is frequently the information systems staff who is asked to pick up the pieces.

Ultimately, interconnecting these nonstandard elements to the enterprise network may be more trouble than it is worth.

• **Observation No. 5:** IS records of existing networks tend to be inaccurate and incomplete. When you complain about the lack of discipline among end users, ask yourself how complete your own network records really are. Do you know where all the coax is, how it runs, where the controllers are? "We have met the enemy, and it is us."

LARRY DEBOEVER

done at user workstations. It is performed under conditions in which a portion of the user's responses may be verified. The desktop audit was designed first to gather basic information about the user's workstation, such as manufacturer, model, operating system, memory, network connection, disk storage, graphics, off-the-shelf PC software and so on. If inventory records exist, they should be verified. In a PC coaxial environment, the coaxial card is particularly important because of the variety and multiple generations of cards available.

Once the demographics are gathered, the user's current information exchange activities should be recorded. This includes the applications and files used, frequency of use, size of transfer and purpose. As a rule of thumb, remember that the larger an individual user's disk drive, the more likely it is that that user is transferring large volumes of data to and from host processors.

Once information on existing use is gathered, the analyst should then turn to the user's unmet requirements, perceived problems and long-term vision of future requirements. It is also useful to ask the user about problem resolution and training needs. To whom does the user turn for support? What is the quality and timeliness of the support the user receives?

Time constraints

Ideally, a desktop audit should be performed at each user's workstation. Keep in mind, however, that an in-depth audit — in which the interviewer verifies the network card, memory and so on — may last as long as 30 minutes. A survey-only interview will last five to 15 minutes. Ideally, an in-depth interview should be performed for every user; however, a good compromise is to perform an in-depth audit of one out of three users, interviewing at least half the users in a department and sending survey forms to the others. Where the size of the user population is too large — or the budget constrained — a written survey may suffice.

But whenever the initial walk-through identifies possible anarchy — multiple dissimilar PCs with unauthorized LANs, for example — a desktop audit should be performed no matter what the cost. As a general rule, a junior analyst can easily cover a 100-person department in a week, assuming an in-depth audit of one in three.

A good preliminary inventory is also usually available from the information center staff. When a user identifies an information resource that does not exist, the user's actual stored request should be examined. The user may well have referred to the data by a pseudonym. If IS identifies a resource that users do not mention, either the resource is useless, users are not aware of it, or both.

Next comes the interconnection audit, which uses the results of the walk-through and existing records to build an inventory of the networks — including separate PC LANs — and the user connections on them. The basic information about individual users' workstations gathered during the desktop audit, particularly the network connections, are added to provide the lowest level of detail.

Once the skeleton of the network is understood, usage information gathered from network management data can be added to understand the volume of data being moved across the network to specific users and work groups.

ONCE THE SKELETON of the network is understood, usage information gathered from network management data can be added to understand the volume of data being moved across the network to specific users and work groups.

It is at this point that the IEI can be automated, using a relational database system. This task can proceed at the same time as the desktop audit.

The information exchange audit synthesizes user input regarding usage gathered from the interviews and surveys performed during the desktop audit. The raw data regarding current usage is then validated using information gathered from the interconnection audit and subsequent IS interviews, as well as interviews with line managers when appropriate. Information on future requirements is also compared with existing usage and discussed with IS and line management.

The goal in this phase is to understand the way in which users believe they access information across the network and to compare those beliefs with reality. Here you are looking for user statements that do not seem possible.

For example, Doe in Personnel states that he accesses the order entry system; however, the desktop audit reveals that Doe does not have an ID on the order entry system. How, then, does Doe get the data? You may find that he gets the data from a file server in which the data is placed by another user, who "shares" it with Doe. (Get the picture, security buffs?)

Or what about the user who says he copies 50,000 characters once a day, but the usage numbers — if you can find them — suggest 50,000 characters three

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times a day, on average, and a 20M-byte transfer every weekend? "Oh yeah, that's just my backup running," might be a typical response to a query on this concern.

The result of all this effort forms the basis for the access and exchange matrix. The AEM is only as good as the degree to which the information contained in it has been validated. The best validation occurs when there is a high degree of interaction with the end user, line management and IS staff as well as solid network usage figures.

The next phase, the information resource audit, identifies the applications, databases and files being accessed by users and applications across the network, whether they are on mainframes, midrange systems or LAN-based servers. Clearly, this information is a major component of the AEM and should identify individuals and groups of users, work flow and so on.

Simply gathering this list of resources and sharing it with other users and managers throughout the organization will generate considerable return on investment for the enterprise. This entire process is often iterative, as more answers produce more questions and the AEM is slowly completed.

Finally, conduct the management survey. It is composed of in-depth interviews and survey data gathered from managers across all tiers of the organization and across all line and staff functions, including IS.

The management survey identifies both current and future information requirements and is most useful in defining the business requirements for information exchange and, consequently, connectivity. The overall goal of enterprisewide networking must be to bring corporate investment in networking and information exchange closer to the actual business requirements.

Management must be asked not only about general requirements for information exchange but also about the specific types of information they need to be more productive and effective.

In addition, the management survey is useful in getting the impressions of managers on the penetration of workstation and LAN technology and the level of current information exchange activity in the company. Managers should be asked about the company as a whole as well as their own area of responsibility. Where managers are out of sync with their company or department, IS can focus specific "briefings" to update them.

A connectivity audit will not solve the problems of enterprise networking. But it can provide a knowledge base on which organizations can make educated decisions about actual usage.

A connectivity audit will not solve the problems of enterprise networking. But it can provide a knowledge base on which organizations can make educated decisions about actual usage, immediate requirements for networks and the relationship among the usage and overall business objectives. In addition, the current information flow can assist management in understanding how the business really works.

The IEI inventory and the access and exchange matrix provide hard input to the planning and design process. This data can also be used to develop a model of overall network performance and to assist in identifying existing bottlenecks and other opportunities to improve performance.

Other areas in which the data from a connectivity audit can assist in IS planning include user support systems, selecting standard hardware and software products, enforcing standards, security, control and overall management. Armed with information from the audit — as long as it is updated periodically — today's IS manager is also much better prepared to identify and defend the return on investment from these efforts. •

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Gallium arsenide technology allows cable television operators to increase channel capacity while reducing power consumption and floor space. The advanced technology replaces microwave vacuum tubes in a new high-power cable television signal transmitter designed and built by Hughes. With the new transmitting equipment, up to eight TV channels can be mounted in a single rack space. Each channel will require less than 100 watts. This translates to half the floor space and less than one-quarter the power consumed by current tube transmitters.

A hybrid lithography process is improving the throughput in the manufacture of advanced hybrid semiconductor circuits. The cost-reduction technology was developed by the Hughes/GE team as part of the Microwave/Millimeter Wave Monolithic Integrated Circuits Program, being conducted for the Department of Defense. With this process, an electron beam is focused on a gallium arsenide wafer to create a circuit's transistor gate area, which requires line widths of .5- to .25- microns. Faster optical methods are used to create the remaining, less critical parts of the circuit. The combination maintains the tight tolerances necessary for operation at extremely high frequencies while increasing throughput over pure electron-beam lithography.

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INDUSTRY INSIGHT

Charles Varga

No novice perceptions

It is said that we live in a world in which perceptions are key. It is not so much what is real but our perceptions about people and events that count. For example, we look with awe at a person who takes an extremely complex job and does it with ease and grace. One such individual is Luanne James, who was recently named executive director of Adapso, the computer software and services industry association.

James is not a neophyte in this position. She brings with her more than 20 years of know-how working in both professional services and software product development. However, chatting with her recently to get a feel for the key issues, concerns and problems that have been brought to her by her constituents, it struck me that her resume, impressive as it is, doesn't cover many of her key attributes.

James is one of those rare people who is comfortable in any milieu. She inspires confidence and confidences alike. She listens to all sides, and all sides tend to listen to her. Her professional credentials might have won her the leadership of Adapso, but it is these personal

Continued on page 71

Earnings bring on the wolf

BY RICHARD PASTORE
CW STAFF

As computer company earnings reports continued to pour in last week, it became increasingly clear that the wolf is at the door of the computer industry. Some firms, such as Microsoft, Compaq and the OLTP gang have slammed their doors in its face. For others such as Data General, Amdahl and Cray, however, the wolf is already in the house, seated at the dinner table and chowing down on net profits.

Microsoft Corp. routed the wolf with a mere word — Microsoft Word, that is. "They had a good product cycle in the second quarter, led by a new version of Word for the PC and Mac," said David Bayer, an analyst at Montgomery Securities.

Ironically, delays in Word development were blamed for Microsoft's earnings woes earlier this year. Bayer also cited new languages and a version of Excel for the **Apple Computer, Inc.** Macintosh as spurring Microsoft's comeback.

However, on the heels of this robust quarter, Microsoft cautioned analysts in a meeting Wednesday that its gross margins for the second half of the calendar year will be lower than previously expected.

The company cited an impending slowdown in microprocessor unit growth; it reportedly forecast growth to be just 10%. The shock waves from this announcement sent stock prices tumbling late last week for several firms, including Microsoft, Apple, **IBM** and **Compaq Computer Corp.**

Shoppers for IBM Personal Computer AT compatibles appear more apt to deal with larger, more established firms such as Compaq than with so-called second-tier clone makers such as **Wyse Technology,** according to David Card, an analyst at Framingham, Mass.-based International Data Corp. Wyse lost $4 million this quarter, while Compaq added $25 million in net profit.

Computer Associates International, Inc. roared in with hefty profit growth and respectable revenue growth, although President Anthony Wang was not entirely pleased.

"Earnings growth for the quarter was very much in line with our expectations," Wang said, "but revenue growth of 31%, while certainly commendable, was somewhat lower than expected."

Analysts agreed that CA's figures are disappointing only in that Wall Street is used to the firm eclipsing its own projections. Instead, the company merely met its projections this time, thereby letting down the overly optimistic.

Stratus Computer, Inc., like fellow on-line transaction processing players **Tandem Computers, Inc.** and **Sequent Computer Systems, Inc.,** made healthy gains, further attesting that OLTP is in demand.

One firm that was hurt was **Cray Research, Inc.,** which whittled down its 10% revenue growth objective for the second half to a new goal of trying to maintain 1988 levels. Competitive and economic conditions have delayed the signing of Cray contracts, according to company President Marcelo Gumucio.

Amdahl Corp. suffered as well. The company blamed rising manufacturing costs as it comes to grips with the more complex technology of its new processors.

Control Data Corp. (CDC) endured another tragic quarter. Chief Executive Officer Robert Price attributed the nearly $500 million loss to restructuring costs, including the jettisoning of CDC's supercomputer business.

In the recent past, the minicomputer sector has been as unstable as the proverbial pig in a house of straw. But some of the companies — **Data General Corp.,** for one — are rebuilding with new material.

The firms are "pursuing nontraditional minicomputer types of strategies to recapture historical growth," said Shao Wang, an analyst at Smith, Barney, Upham & Harris. "It remains to be seen how successful these new strategies will be."

In DG's case, the past quarter is now the low-water mark, according to Nikko Securities Co. International analyst Michael

Continued on page 67

1989 second-quarter earnings

Compaq and CA look up while Cray gazes down

	Revenue April through June (in millions)	Percent change from 1988	Net income April through June (in millions)	Percent change from 1988
Amdahl	$471	11%	$32.8	(38%)[1]
Compaq	$722	58%	$84	43%
Computer Associates	$244	31%	$27	58%
Control Data	$804	(15%)	($497)	—
Cray Research	$128	(4%)	$4.4	(77%)
Data General[2]	$306	(7%)	($23.1)	—
Informix	$33.6	29%	$1.1	(27%)
Microsoft	$220	29%	$45.4	51%
MSA	$67.2	1%	$4.2	(28%)
Phoenix Technologies	$15.9	33%	($0.99)	—
Silicon Graphics	$85.2	84%	$4.8	37%
Storage Technology	$236	13%	$4.4	(21%)
Stratus	$83.3	32%	$9	34%
Texas Instruments	$1.6B	0	$106	15%

[1]Parentheses indicate decrease or loss
[2]Includes gain of $6.3 million before taxes from sale of Sunnyvale, Calif., facility

CW CHART

Inside

- No more restrictions on PC exports to Eastern Europe. Page 66.
- Will Wang sell off Intecom? Page 66.
- Ashton-Tate drops Nussbaum. Page 67.

For CDC, it's a systems strategy for survival

BY JEAN S. BOZMAN
CW STAFF

SAN JOSE, Calif. — Control Data Corp.'s (CDC) Computer Products Group (CPG) plans to survive as a $1.1 billion entity by acting as a general contractor for commercial customers' engineering-scientific computer networks.

CDC's strategy — following the April sell-off of its Imprimis disk-drive division to Seagate Technology, Inc. — combines systems integration and the maintenance of existing CDC systems, CPG President James E. Ousley said during a tour of the firm's West Coast facilities last week. However, that strategy entails reduced overhead and a promise to CDC creditors that CPG will be profitable. "It's one thing to talk about your strategy," Ousley said. "It's another to believe that is how you'll truly survive."

Ousley said commercial customers, particularly those in the aerospace, automotive and utilities industries, were prepared to accept CDC as a value-added reseller of complex Unix scientific and engineering networks. The approach has already been used in Europe, where CDC sales are stronger than they are in the U.S., he said. "Typically, the larger sales have run to $30 million, with integration work for three to five years," Ousley noted. "We do everything from design and procurement to consulting."

CDC's Ousley

To survive, CPG will have to be profitable — something that CDC President Lawrence Pearlman has promised the firm's banking creditors. During the last six months, CPG has trimmed 3,000 employees from its 11,000-person payroll, leaving 8,000 people to create follow-on Cyber mainframe products and maintain CDC's base of some 1,500 mainframes worldwide. The company did not provide details of how the cuts were made.

Spokesmen at CDC's Minneapolis headquarters denied reports last week that there had been summer layoffs in the field-service operation. "We did the layoffs in April so we wouldn't have to do it again," a spokesman said.

Many cutbacks have come in middle management, Ousley said: "Every executive, including me, now has more direct reports. Each one of us will assume more responsibility."

Despite the cutbacks, CPG plans to spend 10% of revenue, or about $100 million, on research and development. Follow-on products are planned for the Cyber 960 and 990, and customers have been shown prototypes that run CDC's labs. A direct sales force of 400 people, including 120 in the U.S., will be responsible for all Cyber sales, Ousley said.

Commerce to remove bars to PC AT trade

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The U.S. Department of Commerce, following up on President Bush's efforts to open trade with Eastern Europe, announced last week that it plans to remove all restrictions on exports of personal computers equivalent to the IBM Personal Computer AT.

Initially, the department will remove export controls on sales of AT-equivalent computers to U.S. allies. In a second step, the U.S. will urge the Paris-based Coordinating Committee on Multilateral Export Controls (Cocom) to decontrol exports to Eastern Europe.

The actions will affect desktop microcomputers using the Intel Corp. 80286 chip, including the IBM Personal System/2 Model 30, as well as Apple Computer, Inc.'s Macintosh Plus and SE models, which use the Motorola, Inc. 68000 chip. However, the change does not affect ruggedized models or laptop micros.

Decontrol warranted

The Commerce Department said decontrol is warranted because Soviet-bloc countries can obtain AT-equivalent microcomputers from a host of foreign suppliers, thus rendering U.S. export controls ineffective. A department study found that AT-equivalent micros are available from 70 vendors in 11 countries outside the Cocom export-control community.

Last week's action followed closely the Commerce Department's relaxation of export controls on most computers sold to U.S. allies, announced one week earlier. That long-sought action was welcomed by U.S. computer vendors because it cuts the red tape involved in sales to Western Europe.

As a practical matter, the new regulation will save exporters and their customers about three to six weeks and considerable paperwork compared with previous licensing procedures, according to William Chastka, vice-president of Washington Resources International, an export management and consulting firm.

The Commerce Department created a new blanket license that permits the export of many goods to 18 specified countries without prior approval, including computers with a processing rate under 550M bit/sec.

That threshold, calculated by the department, is intended to ease the way for exports of most conventional computers such as PCs using the Intel 80386, minicomputers and older mainframes.

However, the rule would exclude supercomputers and systems that run faster than Digital Equipment Corp.'s VAX 6250, Chastka said. He noted that it is questionable whether high-speed PCs and workstations, such as those using the Intel 486 chip, would qualify for the liberal license.

In addition to computers, the general license covers graphic displays, printers, data communications equipment, civilian robots and computer disk drives with a transfer rate of less than 6M byte/sec. The total list involves U.S. goods valued at $20 billion to $30 billion a year, according to the Commerce Department.

James M. LeMunyon, deputy assistant secretary of export administration, noted in a prepared statement that the new rules "have the potential of eliminating thousands of licenses each year without compromising our national security."

The liberalization is based on the presumption that the 18 countries have effective export controls that prevent high-technology equipment from being diverted to Soviet-bloc countries.

The 18 specified countries are the 16 members of Cocom plus Switzerland and Finland. The group includes major exporters such as the UK, West Germany, France, the Netherlands, Canada, Italy and Japan.

License welcomed

The new license, called General License G-Cocom, was welcomed by the Computer and Business Equipment Manufacturers Association (CBEMA) and industry trade experts.

"This positive development, which we fought so hard to realize during consideration of the export-control reforms contained in the Omnibus Trade Act of 1988, also moves the U.S. in the right direction as we prepare for the integration of Europe in 1992," said William Maxwell, vice-president of international issues at CBEMA.

In a related development, the Commerce Department said that virtually all U.S. products may be transferred among the 18 cooperating countries without the need for prior approval. The only exceptions are supercomputers and electronic bugging devices.

Intecom future, Wang fortunes dark

ANALYSIS

BY PATRICIA KEEFE
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc.'s recent admission that it may sell off its Intecom, Inc. subsidiary says as much about the unfilled promise of the early 1980s matchup between PBX makers and computer suppliers as it does about the mini maker's bleak financial situation.

Analysts predict Wang will have a tough time unloading its Allen, Texas-based private branch exchange subsidiary. Sources said the selling price has already dropped from more than $100 million to about $60 million. If a buyer does not surface, some are predicting Wang will have to shut down Intecom.

There are several obstacles to a successful sale. First, Wang will find itself in a weakened bargaining position following an after-tax loss of $63.7 million for the quarter ended in March. This creates the possibility that Intecom could be gotten for a song, which in turn would limit financial relief from the sale.

Second, the trend is for computer vendors to divest themselves of PBX holdings — for example, IBM's pending sale of Rolm Systems to Siemens Corp.

An Intecom sale is necessary, analysts said, to shore up Wang's sagging finances and to improve its own marital prospects.

Wang officials have repeatedly denied that the company is for sale. But analysts note the poor health of founder An Wang, who recently underwent surgery for cancer, adding that his son and successor, company President Frederick Wang, is dogged by critics questioning his ability to lead the firm into the black.

Last April, Frederick Wang declined to comment on reports that Wang had retained the services of an investment bank to find a buyer for Intecom. At that time, Wang said it was "fully committed" to Intecom.

Two weeks ago, Frederick Wang ended his silence. "We are looking at negotiating with bankers to sell Intecom," a spokesman said, attributing the move to "balance sheet issues."

Even some PBX suppliers are battening down the hatches, said Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. One of the big three, Northern Telecom, Inc., is moving to close down sales offices.

Better days

The situation was not always this grim for PBX suppliers. In the early 1980s, analysts explained, computer vendors expected the PBX to emerge as the office hub of the future.

This did not pan out. Instead, local-area networks and other data communications avenues muscled the PBX aside, according to Thomas Nolle, president of CIMI Corp. in Haddonfield, N.J.

In addition, an estimated 80% of the PBX market — confined primarily to large customers — is owned by AT&T, IBM's Rolm Systems and Northern Telecom. Cut-throat pricing further constrains smaller, second-tier players seeking to gain a foothold. "Any deal lost becomes difficult to offset," Nolle said.

Also, smaller players are often faced with selling to their existing users at the low end. "But Intecom's strength is at the high end, and there's no one buying who doesn't already have one" in that segment, Nolle said. The bottom line results in bodies stacking up among the second tier, he said, pointing to Mitel, Z-Tel and IXC. As a result, PBX revenues overall have been fairly flat for the last four or five years.

Wang reportedly has concentrated its efforts on shopping abroad for Intecom. Intecom may hold some attraction to foreign buyers. The purchase could provide an entry into the U.S. market, because of an impressive customer list that is said to include Hughes Aircraft Co. and Coca-Cola Foods. However, some maintain that the U.S. holds negative growth potential. "Most U.S. companies are looking abroad to grow sales," Dzubeck said.

Convex names chairman

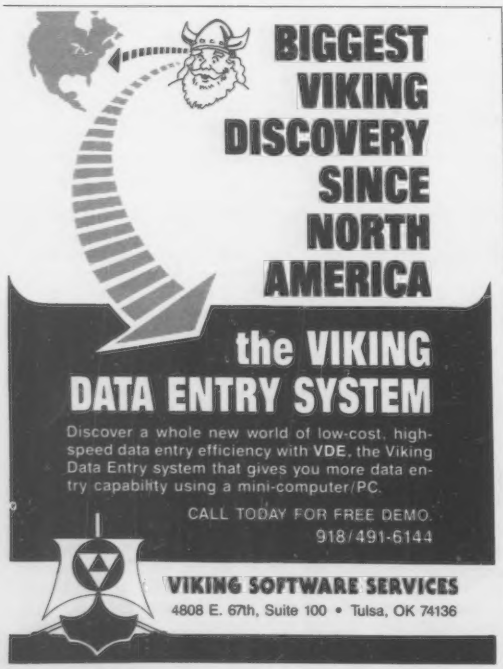
RICHARDSON, Texas — Convex Computer Corp., often noted as the standout survivor in the heavily contested minisupercomputer market, last week celebrated its 19th consecutive quarter of increased sales by naming co-founder and Chief Executive Officer Robert J. Paluck chairman of the board.

"Bob's leadership of the company has been outstanding," said outgoing chairman, venture capitalist and Convex spearhead L.J. Sevin, who will retain a seat on the board.

In a prepared statement, Sevin credited Paluck, a computer industry veteran and longtime Texan who once said that he had made a Richardson headquarters a prime condition for his coming aboard the Convex start-up team, with key credit for the 7-year-old company's financial performance.

For the quarter ended June 30, Convex last week reported net income of $2.4 million — an increase of more than 108% over profits reported for last year's comparable period — on revenue of $37.4 million, a 48% increase over last year's second-quarter revenue.

The new Convex chairman pointed to the company's expansion into several promising new markets, such as commercial transportation, as the underlying factor behind the impressive quarterly gains.



Ashton-Tate bears weight of fiscal fate

BY DOUGLAS BARNEY
CW STAFF

TORRANCE, Calif. — Ashton-Tate Corp. dropped a bombshell last month when it announced an expected second-quarter loss of $15 million. Last week the firm dropped two more: the resignation of President Luther J. Nussbaum and an actual second-quarter loss of $19.8 million.

According to Ashton-Tate, an overload of unsold Dbase IV in the retail channel, aggressive marketing programs and the $8 million write-off stemming from a 1986 acquisition are to blame for the loss. The difference between the predicted and actual loss was blamed on a lack of tax reductions and credits.

Nussbaum, Ashton-Tate insiders said, was the fall guy for the "channel stuffing" that created the huge loss.

Nussbaum, formerly a Businessland executive, was responsible for decisions involving retail distribution. All Ashton-Tate development reported to Nussbaum after the August 1988 departure of Roy Folk, former executive vice-president of software products. Many of Ashton-Tate's inventory problems stem from the slow sales of Dbase IV, which most users believe was released prematurely before it was fully debugged.

Esber to the helm

Chairman and Chief Executive Officer Edward M. Esber Jr. will assume the role of president. According to a statement released by Esber, Nussbaum "resigned over differences in management philosophy." Esber declined to elaborate on those differences or comment further on the reasons for Nussbaum's departure. Nussbaum was not available for comment.

Some see the Nussbaum resignation as a positive step for Ashton-Tate. According to Nancy McSharry, a personal computer software analyst at International Data Corp., Ashton-Tate is at the same point that Lotus Development Corp. reached one year ago. For Lotus, fresh blood and a focus on priorities resulted in a turnaround. The same thing may happen with Ashton-Tate, McSharry said.

The critical product for Ashton-Tate is Dbase IV 1.1, which should fix many of the existing bugs and will work with the Ashton-Tate/Microsoft SQL Server, a multiuser database engine. Users by and large have praised the Dbase IV 1.0 feature set, but most still await a more stable product.

Earnings

FROM PAGE 65

Geran, but the comeback will be slow. "I would guess that given the transition from proprietary technology to Unix-based, it's going to take at least another six to nine months," Geran said.

Strong product cycles figured prominently in separating the victors from the mere wolf fodder in this quarter, analysts agreed. Companies citing specific product champions included **Silicon Graphics, Inc.** (high-end and low-end Iris three-dimensional graphics workstations), Compaq (Deskpro 386/33 and 286E) and **Informix Corp.** (Smartware II).

Another nearly universal factor influencing quarterly earnings was the overseas value of the dollar, analysts said. Some companies that have committed heavily to overseas markets took a pummeling from the strong dollar, but the strategy is still sound, according to Geran.

"You have to go overseas and ride out the dollar value. You have to view it as just one of the hazards of the international market," he said. Companies fingering the dollar value as a culprit included Texas Instruments, Inc., CDC, Amdahl and DG. Compaq, by hedging currencies, was protected from the short-term effects of the dollar, said Mike Swavely, president of Compaq North America. "But if the currency continues to go in a certain direction over a long period of time, that will have an impact," he said.

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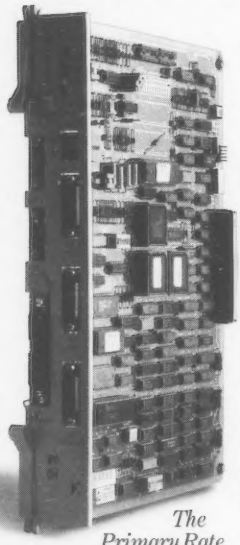

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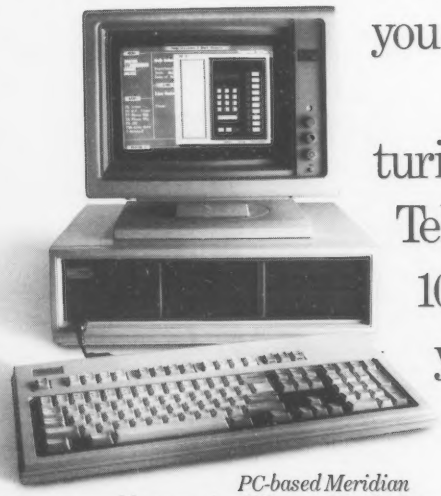

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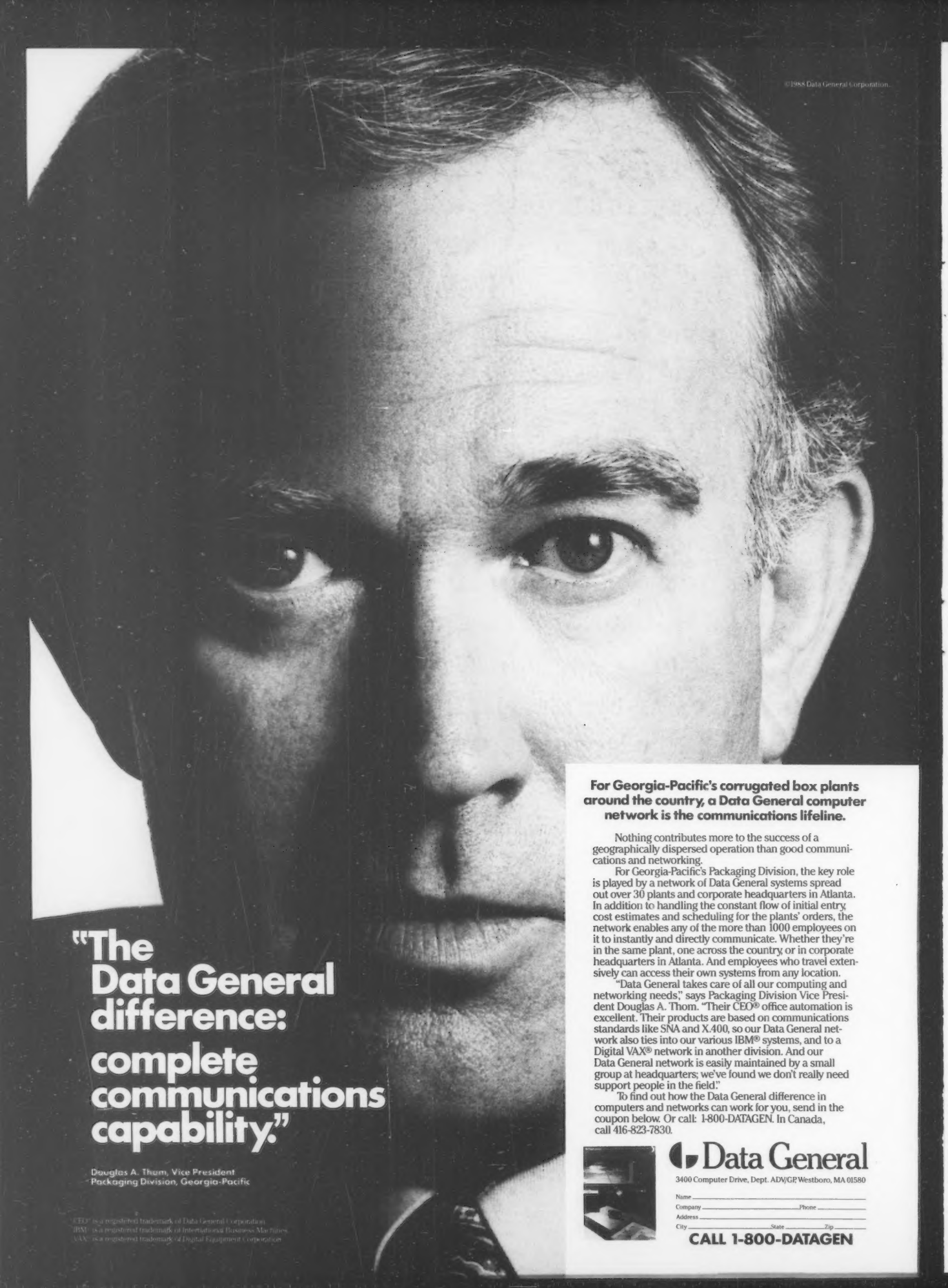

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Varga

CONTINUED FROM PAGE 65

traits that arm her so well for the battles Adapso needs to take on if it is to best serve the software sector.

For instance, take the computer virus issue. "The industry is concerned about [the issue] on a different level than is the general public," James noted. "One of the things our companies worry about that does not affect the public is the liability issue."

What the industry is faced with on the state level is a series of varying laws under which individuals are prosecuted and verdicts reached. On the federal level, the Internet situation in November 1988 exposed some of the loopholes within existing laws. "Defendants are getting plea bargains under the federal statutes, and we are not aware of a single conviction," James noted.

Adapso is tackling the problem on several fronts. First, they have commissioned Eugene Spafford — a professor at Purdue University and one of the first people to do a technical analysis of the Internet worm — to prepare a paper called "Dealing with Electronic Vandalism."

The paper will review software security systems issues and, most importantly, will provide an overview of existing laws. In addition, the association is working with other trade associations and the Justice Department to prepare some technical amendments to the federal Computer Crime and Abuse Act.

Another hot topic, according to James, is the bundling issue. "The Digital Equipment Corporation software bundling issue continues to come up and gets a lot of coverage. A lot has been distorted. This software bundling issue is of particular concern to member firms that are software vendors, and specifically independent database providers such as Oracle, Sybase and Software AG — each of which has been a principal complainant," she said.

What DEC has done is to combine its relational database one-time license with its VAX operating system, thereby bundling its database product with its operating system and cutting out independent database suppliers. Many people feel that this is a lockout strategy. "DEC is being extremely cooperative and has agreed to sit down and talk about the issue face-to-face to see where the problems are," James added.

For MIS managers and vendors alike, the perception of keeping an orderly house is key. Whether dealing with the issue of computer viruses or software bundling, each can be viewed as a two-way street — a threat or an opportunity.

With James at its helm, it is clear which way Adapso is headed.

Varga, a 20-year computer industry veteran based in Frenchtown, N.J., is publisher of "The Cerberus Report," a study of industry mergers and acquisitions.

IN BRIEF

Taxpayers catch 11th-hour break

The **U.S. House of Representatives' Committee on Ways and Means** voted earlier this month to extend a host of expiring tax breaks, including the tax credit for research and development expenditures. The panel's tax bill would make the research and development credit permanent and tie the amount of the credit to the amount a company invests in R&D as a percentage of sales.

Delays spawn review wait

U.S. District Judge Harold H. Greene approved a Department of Justice plan to delay the 1990 triennial review of the **AT&T** divestiture judgment. The Justice Department argued that the delay is needed because appeals of the first triennial review, which was done in 1987, are still pending.

Just plain good news

Computer industry pioneer and Wang Laboratories, Inc. founder **An Wang** is recovering well from cancer surgery undergone earlier this month, according to a report that was issued last week by the Wang family.

"My father is a strong-willed, tough tiger," said Wang CEO **Frederick Wang**.

Stepping out

IBM treasurer **David Finley**, who in the mid-1980s helped spearhead **IBM Credit Corp.** and served as its first president, last week left his post and announced that he will retire from the company at the end of the year. IBM veteran **Robert Ripp** was elected treasurer. In his remaining months at the corporation, Finley will be on special assignment to company senior vice-president of corporate finance and planning Frank Metz.

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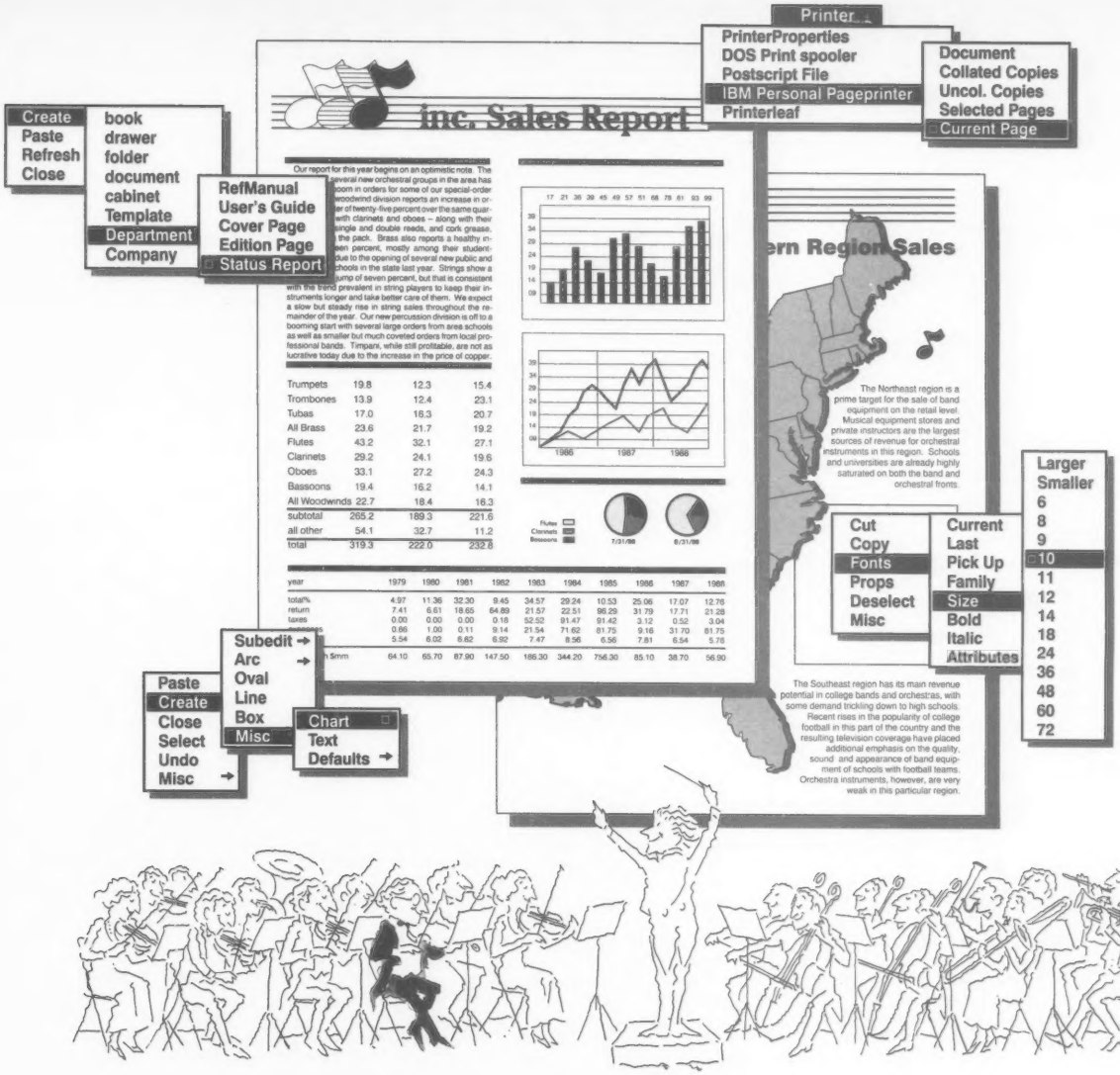

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IS abroad — it's not just a job

Systems pros say working overseas can be difficult, but they'd do it again

BY SHERYL KAY
SPECIAL TO CW

If the excitement of being the first information systems professional on your block to run a relational database or IBM's Application System/400 is just not there anymore, perhaps a stint overseas would do the trick.

While opportunities have become more limited in much of the Third World, the shortage of skilled computer professionals in Europe and Australia is getting more and more acute, according to David George at Icon Management Consultants, Inc. in Marina Del Ray, Calif., which recruits systems professionals for overseas assignments.

Good IBM mainframe applications development people are always in demand, as are experts in ACP/TPF, artificial intelligence, C and Unix, according to George. Overseas organizations generally rely on homegrown management, but sometimes American managers are in demand in less developed countries, he says.

Positions may last three months or 10 years and involve work with private industry or government — either U.S. or foreign. Federal government jobs are listed with the Information Resources Management offices of various agencies.

Despite obstacles they have faced in working overseas, several IS professionals contacted agree they would do it again, given the right opportunity.

Overseas challenge

Clifton Franklin, who returned home to Los Angeles in June from a three-year assignment with the U.S. Agency for International Development in Haiti, emphasizes the technical opportunities and challenges his overseas position presented. "Rarely in the U.S. today could you find yourself walking into a medium to large-size company where there were no computers and you started everything from scratch," he says.

Franklin's responsibilities included building the computer room; installing hardware and software; training; and performing routine maintenance. "It was like raising a baby — you start from scratch, you build it, and you watch it grow," he says. "Helping the mission get itself to a working level of computerization was fantastic."

There were some hitches, including the lack of clean and stable electrical power, which led to a three-month wait for an uninterruptible power supply to be delivered from the U. S. To acquire equipment, Franklin also had to become expert in technology treaties between the U. S. and Haiti.

Nora Evans, who worked in Johannesburg, South Africa, as a computer support specialist for computer graphics vendor Intergraph Corp. in Huntsville, Ala., ran into a conservative attitude toward women in the workplace.

> "RARELY IN the U.S. today could you find yourself walking into a medium to large-size company where there were no computers and you started everything from scratch."
>
> CLIFTON FRANKLIN

"For a long time I did absolutely nothing because they refused to give me anything to do," Evans says of the gold mining company she was assigned to work with. Although she eventually did some IS training work, she does not feel that she advanced her career in terms of technical skills.

Overseas workers may experience culture shock in adjusting to the customs of host countries. Beverly Morris, supervisor of mainframe applications for Aramco Services Corp. in Houston, had never ventured further than a Mexican border town when she took on a 4-year stint as a systems analyst and then a group leader at Aramco in Dhahran, Saudi Arabia.

"You had to roll with the punches," says Morris, who was joined in the move by her husband, another Aramco IS professional. For instance, women were required to wear long skirts and sleeves in public and were not allowed to drive.

Morris says they were able to manage the adjustment because they approached the situation with an open mind. "We went with an optimistic attitude that we were going to adapt to their different cultural customs, and it was a great learning experience," she says.

IS professionals who have worked abroad say others who do so should investigate the culture of the host country before going there. However, it is important to see through traditional stereotypes. Linda Barnett, a technical manager at Intergraph who has worked in Ankara and Istanbul, Turkey, points out that notions of veiled women in that country are out of date. Three of the five technicians assigned to her project with the city governments were women, she adds.

Barnett says the chief stumbling block in her experience was not knowing the Turkish language; the systems professionals generally say they could get by with English, but some found fluency in the native tongue a tremendous advantage.

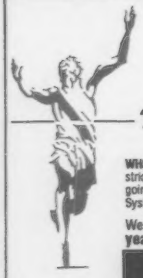
Veterans of overseas work point out other considerations for individuals who find the prospect of working overseas enticing. They include the need for visas, work permits and health certificates; the possibility of incurring moving expenses; and variations in costs of living abroad.

Also, taxes should be reviewed with an accounting professional. "Many programmers think they don't have to pay any taxes if they work overseas, and that's not always true," George says.

Other issues arise upon returning home. "You have to adjust to going back to the American corporate way of doing things in data processing," Evans says. "When you're in a foreign country, you're really on your own, and when you return you have to fit back in again."

Kay is a Tampa, Fla.-based business consultant and free-lance writer specializing in emerging technologies and human resources.

DATA PROCESSING, AS/400, S/38



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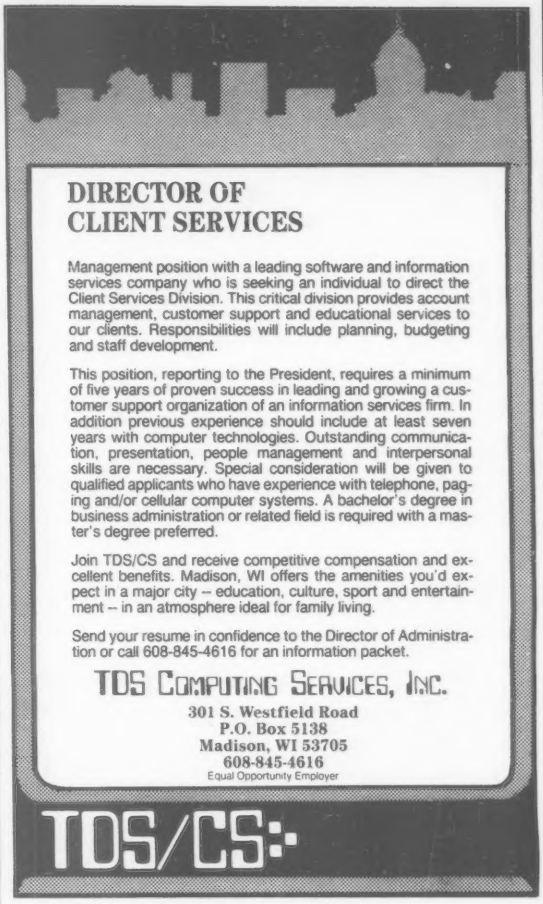

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MARKETPLACE

VARs charge midrange arena

Users turn from vendors, rely more on resellers' expertise and support

BY ALICE BREDIN
SPECIAL TO CW

The past year has seen soaring sales of midrange systems through value-added resellers, or VARs. The reasons for this development, purchasers say, are that VARs are learning more about their customers' work and offer support, delivery and applications that vendors do not match.

VARs, which add value to the systems they sell through software, integration or support, are taking an increasing share of business from vendors' direct sales of midrange systems.

Unit sales of midrange systems by VARs grew 34% from 1987 to 1988, while vendors' direct sales fell 7%, according to International Data Corp. (IDC), a Framingham, Mass.-based market research firm. Between 1989 and 1992, direct sales should hold steady while the VAR business expands another 12%, according to IDC.

"IBM's strategy to push its midrange systems through the VAR channel is the major reason for the surge," says IDC analyst Art Hutchinson. "Also, with the proliferation of commodity boxes running standards, the only way to differentiate products will be vertical market software."

IBM began aggressively funneling personal computer and midrange systems through resellers during the last year in response to complaints from customers that it was not supporting sales properly and gripes from resellers about competition for business.

VARiety

Other major vendors such as Digital Equipment Corp., AT&T, Hewlett-Packard Co. and Sun Microsystems, Inc. also have active VAR strategies, and additional manufacturers such as Data General Corp., Bull H. N. Information Systems, Inc. and Prime Computer, Inc. are expected to join them.

IS directors cite a variety of reasons to buy through VARs. Among them are the following:

• **VAR personnel are becoming more expert about clients' work.** "VARs are getting smarter," says Steve Azzam, member of the technical staff at the Space & Communications Group of Hughes Aircraft Co. in Torrance, Calif. Hughes ordinarily purchases directly from such vendors as IBM and HP because of the large volume discounts the company receives.

Last year, however, a VAR came to Azzam with a way to use a complex computer-aided design application on his mainframe computer. "I could have bought the components myself and done it, but the VAR knew exactly how to do it and offered me a complete solution," Azzam says.

Even corporations with an in-house support staff use VARs to pass the VARs' knowledge on to their own people. "The first time around, it is nice to let someone who knows what they are doing take care of it. Then you can do it yourself," says Dennis Maxwell, president of Food Service Associates, Inc. in Boston.

• **Buying from a VAR can eliminate the finger-pointing prevalent in efforts to solve problems with multivendor configurations.** Often when something malfunctions in a multivendor environment, each vendor places blame on the others. Rather than calling each vendor to determine accountability, many purchasers are buying from VARs that provide complete support for multivendor systems.

While buying directly from the vendor remains the preferred choice of users in need of equipment only, those looking for service and support, particularly in a multivendor environment, are increasingly making their purchases from VARs.

"If we bought PCs [from a vendor] but chose not to use their network, we would not be able to get support from the vendor for the entire configuration," says Sandy Miller, systems programmer at Oshkosh Truck Corp. in Oshkosh, Wis. She adds, however, that "if I needed equipment without support, I would still buy directly from a vendor."

• **VARs sometimes can deliver equipment more quickly than vendors.** VARs may have equipment in stock, while vendors sometimes manufacture to order, purchasers say. "I considered buying directly from a vendor, but as [a small business], I can get equipment much more quickly from a VAR," says Jack Hendler, executive vice-president of E. Greenwald & Co., a lingerie manufacturer in New York.

"IBM might be better for General Motors or Fortune 500 companies, but I can get my equipment in an average of 30 days from my VAR, and I couldn't get that from a vendor," Hendler says.

• **For certain niches, VARs are the only source of vertical application software.** United Plans, Inc. in Waltham, Mass., buys VAX equipment through a VAR rather than DEC because the VAR writes the software and then makes a hardware recommendation based on the program.

"Our VAR is in tune with how much memory and disk space we need and is more in tune than a vendor would be with what we need," says Paul Arakeliam, the comptroller at United Plans.

Naturally, the added value provided by VARs comes at a higher cost than a direct purchase from a vendor. The difference depends on the customer; for a company like Hughes, which is HP's largest customer and therefore receives substantial volume discounts from the company, a purchase from a VAR could cost 30% more than an acquisition from a vendor, Azzam says.

Bredin is a free-lance writer based in New York.

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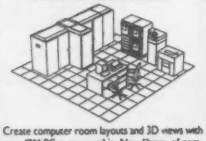

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Request for Proposal No. 1628, due Monday, September 11, 1989 at 3:30 p.m. for the acquisition of software to establish an IBM 3090 network-based Patient Information Management System for the MISSISSIPPI STATE DEPARTMENT OF HEALTH and health clinics statewide. All vendors who desire to participate in this project must attend a bidders' conference on Tuesday, August 15, 1989. Details are covered in the RFP.

Request for Proposal No. 1630, due Monday, August 14, 1989 at 3:30 p.m. for the acquisition of a degree audit processing and advisement software package capable of fully integrating with the Information Associates' Student Information System currently installed within an IBM-MVS/XA environment at JACKSON STATE UNIVERSITY.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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NOTICE OF ENTRY OR ORDER REQUIRING CREDITORS TO FILE PROOFS OF CLAIM

TO ALL PERSONS ASSERTING A CLAIM AGAINST THE ABOVE REFERENCE DEBTOR:

PLEASE TAKE NOTICE, that the United States Bankruptcy Court for the Northern District of New York has entered an order requiring all persons who assert a claim against the Debtor arising, with respect to such Debtor, prior to March 31, 1989 whether such claim is fixed, liquidated, unliquidated, contingent or disputed, to file a proof of claim in accordance with the instruction set fourth below with the Clerk of the United States Bankruptcy Court, Northern District of New York, 10 Broad Street, 230 United States Courthouse, Utica, New York 13503, ON OR BEFORE NOVEMBER 1, 1989.

ANY CLAIM FILED AFTER NOVEMBER 1, 1989 WILL BE DISALLOWED. ANY PERSON OR ENTITY THAT IS REQUIRED TO FILE A CLAIM ON OR BEFORE NOVEMBER 1, 1989 AND THAT FAILS TO DO SO WILL NOT BE TREATED AS A CREDITOR FOR PURPOSE OF VOTING OR DISTRIBUTION, AND ANY CLAIM OF SUCH PERSON OR ENTITY WILL BE FOREVER BARRED. FURTHER, ALL CREDITORS LISTED BY THE DEBTOR ON ITS SCHEDULES ORIGINALLY ENTERED BY THE COURT CLERK ON APRIL 4, 1988 ARE FOUND BY THE AUGUST 1, 1989 CLAIMS BAR DATE ORIGINALLY ESTABLISHED HEREIN. THE DEBTOR AND CREDITORS COMMITTEE ARE RESERVED THE RIGHT TO CHALLENGE ANY AND ALL CLAIMS ON ANY AND ALL AVAILABLE GROUNDS INCLUDING THAT A PARTICULAR CLAIM WAS NOT TIMELY FILED.

Exceptions: Persons who assert claims solely as sureties or guarantors must file a proof of claim as required herein on or before December 1, 1989. Persons who assert claims solely be reason of recovery by the Debtor's estate of an executory contract or unexpired lease, the avoidance of a transfer of a tax claim pursuant to Bankruptcy Code Sections 502(g), (h) and (i) shall file a proof of claim on or before the later of December 1, 1989 or 30 days after an order is entered under Bankruptcy Code Sections 502(g), (h) or (i).

A creditor may, for cause shown, apply to the Court prior to the expiration of the bar date for an order extending the bar as to such creditor. Any such application must be on three days prior written notice to the attorneys for the Debtor.

ALL PERSONS WHO FAIL TO FILE A PROOF OF CLAIM IN ACCORDANCE WITH THE COURT'S ORDER SHALL BE FOREVER BARRED FROM ASSERTING A CLAIM AGAINST THE BANKRUPTCY ESTATE OF ICS CYBERNETICS, INC.

Proofs of claim should be filed in conformity with Official Form 15 to the Bankruptcy Rules of Procedure with: Clerk, United States Bankruptcy Court, Northern District of New York, 10 Broad Street, 230 United States Courthouse, Utica, New York 13503, ON OR BEFORE NOVEMBER 1, 1989.

Further information may be had from the Debtor's attorneys or the Creditors Committee at the addresses listed below.

DATED: Buffalo, New York, July 20, 1989

BY ORDER OF THE COURT
STEPHEN N. GERLING
UNITED STATES BANKRUPTCY JUDGE

HODGSON, RUSS, ANDREWS, WOODS & GOODYEAR, (Garry M. Graber)
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of Creditors Holding Unsecured Claims
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Finding an info center niche

Reassignments could improve both consistency and control of training

BY BILL SEBRELL
SPECIAL TO CW

A few years ago, information centers began to appear in many corporations as service centers for personal computer users. One problem with this development was that the information centers often dealt with the same end users that mainframe developers supported.

If an end user went to the information center with a problem, he got a microcomputer solution. If he went to the regular application development people, he got a mainframe solution. Unfortunately, there has been no impartial mediator to decide which solution is better.

Over the long haul, based on which door the end user enters, the solution provided may be counterproductive or, worse yet, wrong for the corporation.

This tug-of-war has raised a crucial issue concerning instruction. In the past, senior managers rarely designated which training group should take care of the educational needs of the information center's end users. Was this training the responsibility of the information center? The corporate training organization? The information system's training organization? In addition, no one adequately anticipated this training demand or its budgetary implications. These oversights essentially created a training vacuum.

Even though information centers lacked training expertise, in the beginning they had the necessary money, technical knowledge and, more importantly, ready access to end users necessary to deliver training. Training was consistent with their strategy. Given these factors, together with inertia on the part of IS training organizations, it is no wonder that the information centers actively entered the training arena.

This development created several problems, however. The quality of training within a company often varied among training organizations, as did the means of delivering it, which created confusion among end users. Also, the costs of proper training were not clear, and there was a lack of control over the budgets for providing it.

So where are we today?

The issue of who is responsible for training has yet to be fully resolved, and considerable competition remains among all three training organizations. The information centers are not equipped or interested in teaching computer literacy, DOS and basic personal computer applications to large groups of people. For that reason, either the IS or corporate training organization generally takes on that load. The requirements for this type of training have fallen back to the traditional training functions, both of which have had a considerable uphill battle to get the necessary dollars for facilities, equipment, software and staffing. The information center, on the other hand, does provide one-on-one training on these topics when it is necessary to support an individual client.

The system works, but not very well. Whenever a new software package emerges through the information center, the competition begins anew. The more complex software appearing today, such as desktop publishing programs, causes more concern and dissension; training is required not only in the use of the packages but in how to apply them — for example, through instruction in graphic layout and design. Companies have yet to develop policies for moving training responsibility from one group to another.

Installing, managing and running networks is another example of a complex application for which end users want training in volume. Particularly in remote locations, users have a crucial need to know how to operate on a day-to-day basis and how to identify and correct problems. This type of training requires courses developed and delivered by experienced trainers, not casual one-on-one coaching.

In corporate organizational structures, information centers typically report to an IS manager responsible for office automation. Because clients of the information centers have matured and tend to view the centers more as consultants than application developers, perhaps it is time to consider changing the reporting structure.

With training so interwoven into the fabric of the information center and consulting so woven into the fabric of technical training, it makes sense to arrange for the information center to report to the manager of the IS training organization.

With such a reassignment, the competition for training should disappear. The delivery and quality of training would be standardized and improved. There would certainly be less confusion on the part of the clients, and costs and budgets for proper training support would be clearly identified and brought under control.

BECAUSE clients tend to view the centers as consultants, perhaps it is time to consider changing the reporting structure.

Sebrell is a vice-president at Data Base Management, Inc., a subsidiary of American Management Systems, Inc. in Manchester, Conn.

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COMPUTERWORLD

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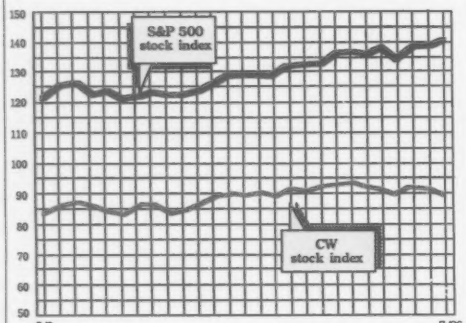
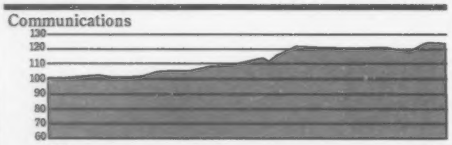
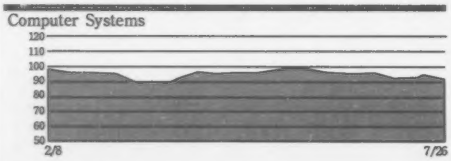
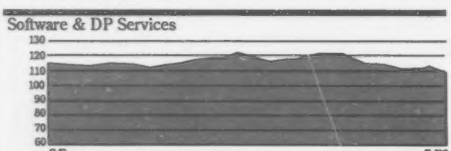
STOCK TRADING INDEX

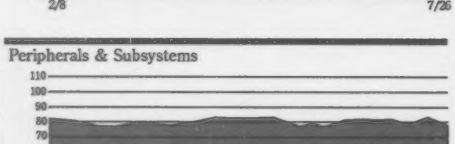


Indexes	Last Week	This Week
Communications	124.9	124.8
Computer Systems	95.1	91.9
Software & DP Services	111.9	109.4
Semiconductors	56.6	55.2
Peripherals & Subsystems	81.7	78.3
Leasing Companies	115.5	119.9
Composite Index	90.5	89.2
S&P 500 Index	139.6	140.7









CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 26, 1989

EXCH		52-WEEK RANGE		PRICE CLOSE JULY 26, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
	Communications and Network Services					
N	AMERICAN INFO TECHS CORP	62	44	58.75	0.1	0.2
Q	ANDREW CORP	26	16	25.25	1.8	7.4
Q	ARTEL COMM CORP	8	2	6.625	0.4	6.0
N	AT&T	39	24	39.375	2.5	6.8
Q	AVANTEK INC	7	4	5.75	0.0	0.0
N	AYDIN CORP	19	13	17.375	-0.3	-1.4
N	BELL ATLANTIC CORP	93	68	92.125	0.4	0.4
N	BELLSOUTH CORP	52	39	50.375	-0.5	-1.0
Q	COMPRESSION LABS INC	9	3	8.875	1.0	12.7
Q	COMPUTER NETWORK TECH	3	1	2.688	0.0	0.0
Q	CONTEL CORP	66	34	60.625	-2.8	-4.5
Q	DATA SWITCH CORP	8	4	4	0.1	3.2
Q	DIGITAL COMM ASSOC	33	17	20.875	-1.3	-5.6
Q	DYNATECH CORP	22	17	17.25	-0.1	-0.7
Q	FIBRONICS INTERNATIONAL INC	7	3	6.75	-0.1	-1.8
Q	GANDALF TECHNOLOGIES	7	4	5.625	-0.1	-2.2
Q	GENERAL DATACOMM INDS	6	3	5.25	-0.3	-4.5
N	GTE CORP	58	39	57.875	0.0	0.0
Q	INFOTRON SYS CORP	13	10	10.5	0.0	0.0
N	ITT CORP	62	46	62.25	2.4	4.0
N	M A COM INC	11	8	7.75	-0.6	-7.5
Q	MCI COMMUNICATIONS CORP	42	16	38.125	-1.3	-3.2
N	NETWORK EQUIP TECH INC	25	14	21.375	-1.9	-8.1
Q	NETWORK SYS CORP	12	8	9	0.4	4.3
N	NORTHERN TELECOM LTD	20	14	20.375	1.5	7.9
Q	NOVELL INC	38	24	27	-0.8	-2.7
N	NYNEX CORP	84	63	76	3.6	4.6
N	PACIFIC TELESIS GROUP	45	28	42.375	-1.5	-3.4
A	PENRIL CORP	6	3	5.5	-0.2	-3.3
N	PLESSEY PLC	46	25	43.75	1.8	4.2
N	SCIENTIFIC ATLANTA INC	21	10	19.5	-0.4	-1.9
N	SOUTHWESTERN BELL CORP	56	36	54.75	0.0	0.0
Q	3 COM CORP	29	16	16.625	-0.5	-2.9
N	U S WEST INC	73	53	69.875	-0.6	-0.9
	Computer Systems					
Q	ALLIANT COMPUTER SYS	8	3	4.625	-0.4	-7.5
Q	ALPHA MICROSYSTEMS	8	5	7.375	0.5	7.3
Q	ALTOS COMPUTER SYS	10	6	5.875	0.0	0.0
A	AMDAHL CORP	25	15	15	-0.8	-4.8
Q	APPLE COMPUTER INC	50	34	38.25	-2.3	-5.6
N	BOLT BERANEK & NEWMAN	18	7	7.375	-0.3	-3.3
N	COMPAQ COMPUTER CORP	102	50	86.875	-7.9	-8.3
N	COMMODORE INTERNATIONAL	20	9	10.25	-2.6	-20.4
Q	COMPUTER AUTOMATION INC	7	3	3.625	0.1	3.6
N	CONTROL DATA CORP	24	16	21.625	-0.5	-2.3
Q	CONVEX COMPUTER CORP	15	7	13.875	0.3	1.8
N	CRAY RESH INC	85	41	42	-3.4	-7.4
Q	DAISY SYS CORP	10	3	3.25	-0.1	-3.7
N	DATA GEN CORP	21	14	17	-1.0	-5.6
N	DATAPOINT CORP	6	3	5.25	0.1	2.4
Q	DELL COMPUTER CORP	13	6	7.125	-0.4	-5.0
N	DIGITAL EQUIP CORP	122	86	91.5	-3.5	-3.7
N	FLOATING POINT SYS INC	4	2	2.5	-0.3	-9.1
N	HARRIS CORP	35	25	34.875	1.5	4.5
N	HEWLETT PACKARD CO	62	44	52.125	-1.9	-3.5
N	HONEYWELL INC	90	57	87.375	3.8	4.5
N	IBM	131	106	112.5	-1.9	-1.6
Q	INFORMATION INTL INC	16	13	15.25	-0.3	-1.6
Q	IPL SYS INC	9	2	8	-0.3	-3.0
N	MAI BASIC FOUR INC	20	5	5.375	-0.6	-10.4
N	MATSUSHITA ELEC INDL LTD	219	158	165.125	-1.0	-0.6
Q	MENTOR GRAPHICS CORP	45	23	33.25	-4.0	-10.7
N	NBI INC	5	1	2.25	-0.3	-10.0
N	NCR CORP	62	51	59.75	1.8	3.0
N	PRIME COMPUTER INC	21	12	15.75	-3.4	-17.6
Q	PYRAMID TECHNOLOGY	20	9	12	1.3	11.6
Q	SHAREBASE CORP	4	2	2.313	0.0	0.0
Q	SILICON GRAPHICS CORP	21	14	17.5	0.3	1.4
Q	STRATUS COMPUTER	35	21	28.5	-1.3	-4.2
Q	SUN MICROSYSTEM INC	23	13	15.625	-1.3	-7.4
Q	SYMBOLICS INC	3	1	1.625	-0.1	-7.1
Q	SEQUENT COMPUTER SYS INC	28	14	26.625	0.8	2.9
N	TANDEM COMPUTERS INC	21	12	19.75	0.3	1.3
N	TANDY CORP	47	38	44.125	-0.8	-1.7
N	ULTIMATE CORP	13	7	8.5	0.0	0.0
N	UNISYS CORP	38	20	20.75	-3.0	-12.6
A	WANG LABS INC	11	6	6.375	-0.5	-7.3
	Software & DP Services					
Q	ADVANCED COMP TECH	4	1	0.938	-0.4	-31.8
Q	AMERICAN MGMT SYS INC	19	11	11.625	-0.9	-7.0
Q	AMERICAN SOFTWARE INC	18	8	14.25	-1.3	-8.1
N	ANACOMP INC	10	5	5.25	-0.5	-8.7
Q	ANALYSTS INTL CORP	22	8	21	0.8	3.7
Q	ASHTON TATE	28	14	15	-2.5	-14.3
Q	BASK COMPUTER SYS INC	18	12	14.125	0.8	5.6
Q	AUTODESK INC	40	23	35	-0.6	-1.8
N	AUTO DATA PROCESSING	42	35	40.5	-0.4	-0.9
Q	BMC SOFTWARE INC	24	8	21.75	0.0	0.0
N	BOOLE & BABBAGE INC	20	9	15.625	-0.3	-3.8
N	BUSINESSLAND INC	15	10	11.75	0.3	2.2
N	COMPUTER ASSOC INTL INC	22	12	18	-0.1	-0.7
Q	COMPUTER HORIZONS CORP	12	7	8	0.0	0.0
N	COMPUTER SCIENCES CORP	56	44	54.375	1.9	3.6
Q	CORPORATE SOFTWARE	16	9	11.75	0.5	4.4
N	COMPUTER TASK GROUP INC	17	11	12.875	1.3	10.8
Q	COGNOS INC	9	5	6.125	0.0	0.0
Q	COMSHARE INC	35	18	32.875	0.1	0.4
N	CULLINET SOFTWARE INC	9	4	8.625	0.0	0.0
N	GENERAL MTRS (CLS E)	54	39	52.5	-0.9	-1.6
Q	HOGAN SYS INC	7	4	6.125	-0.3	-3.9
Q	INFORMIX CORP	14	7	9.125	-0.1	-1.4
Q	INTELLICORP INC	5	2	3.625	0.0	0.0
Q	KEANE INC	19	6	14.25	-0.5	-3.4
Q	LEGENT CORP	30	16	30	4.5	17.6
Q	LOTUS DEV CORP	27	15	23.5	-1.0	-4.1
Q	MANAGEMENT SCI AMER	12	6	10.375	-0.1	-1.2
Q	WORDSTAR	4	2	2.125	0.1	6.2
Q	MICROSOFT CORP	65	45	52.75	-1.4	-2.5
Q	NATIONAL DATA CORP	34	19	33.125	2.8	9.1
N	ON LINE SOFTWARE INTL INC	7	4	6	-0.4	-5.9
Q	ORACLE SYS CORP	17	7	15.875	-0.6	-3.8
N	PANSOPHIC SYS INC	18	12	12.875	-0.3	-1.9
Q	PHOENIX TECHNOLOGIES INC	19	6	6	-0.8	-11.1
Q	POLICY MGMT SYS CORP	32	21	31.5	-0.8	-2.3
Q	PROGRAMMING & SYS INC	20	12	19.25	-0.5	-2.5
Q	RABBIT SOFTWARE INC	3	1	1.063	-0.1	-10.5
Q	RELATIONAL TECHNOLOGY INC	20	9	10.125	0.3	2.5
N	REYNOLDS & REYNOLDS CO	34	18	25.375	0.4	1.5
Q	SEI CORP	20	16	18.5	0.4	2.1
Q	SHARED MED SYS CORP	20	14	16.125	-0.4	-2.3
Q	SAGE SOFTWARE INC	10	6	7.5	-0.9	-10.4
Q	SOFTWARE PUBG CORP	29	16	21.125	-2.4	-10.1
A	STERLING SOFTWARE INC	8	5	6.75	0.0	0.0
Q	SUNGARD DATA SYS INC	20	13	17.5	-0.1	-0.7
Q	SYSTEMATICS INC	37	26	32	-1.3	-3.8
N	SYSTEM CENTER INC	28	13	23.625	-1.6	-6.4
N	SYS. SOFT INC	27	11	22.5	-1.8	-7.2
	Semiconductors					
N	ADV MICRO DEVICES INC	14	7	9	-0.3	-2.7
N	ANALOG DEVICES INC	14	10	10.125	-0.5	-4.7
Q	ANALOGIC CORP	11	7	10	0.1	1.3
Q	CHIPS & TECHNOLOGIES INC	26	11	22.625	-1.9	-7.7
Q	INTEL CORP	38	19	28.5	0.0	0.0
Q	LSI LOGIC CORP	14	8	8.875	-0.1	-1.4
Q	MICRON TECHNOLOGY INC	26	14	14.375	-0.8	-5.0
N	MOTOROLA INC	60	36	55.25	-1.8	-3.1
N	NATL SEMICONDUCTOR	11	7	7	0.0	0.0
N	TEXAS INSTRS INC	47	35	39	-0.5	-1.3
A	WESTERN DIGITAL CORP	15	9	8.875	-0.3	-2.7
	Peripherals					
Q	ALLOY COMP	4	1	1.875	0.0	0.0
N	AM INTL INC	6	5	5.25	0.0	0.0
Q	AST RESH INC	17	7	8.875	-0.4	-4.1
Q	AUTO TROL TECH CORP	6	4	4.875	0.4	8.3
Q	BANCTEC INC	16	8	14.875	-1.0	-6.3
Q	CIPHER DATA PRODS INC	11	8	8.25	-0.9	-9.6
A	COGNITRONICS CORP	7	2	6.125	-0.5	-7.5
Q	CONNOR PERIPHERALS	15	7	10.625	-1.4	-11.5
A	DATAPRODUCTS CORP	18	10	13.125	-0.3	-1.9
A	DATARAM CORP	11	7	8.625	-0.3	-2.8
N	EASTMAN KODAK CO	52	42	47.25	-1.5	-3.1
N	E M C CORP MASS	6	3	5.25	-0.1	-2.3
Q	EMULEX CORP	12	7	8.125	-0.9	-9.7
Q	EVANS & SUTHERLAND	22	13	20.5	-0.5	-2.4
Q	ICOT CORP	4	2	1.75	-0.3	-12.5
Q	INTERLEAF INC	12	6	7.75	0.0	0.0
Q	IOMEGA CORP	5	2	2.5	0.0	0.0
Q	LEE DATA CORP	4	2	2.5	-0.3	-9.1
Q	MASSTOR SYS CORP	4	2	3	-0.2	-5.9
Q	MAXTOR CORP	11	6	9	-0.9	-8.9
Q	MICROPOLIS CORP	14	4	4.375	-0.4	-7.9
Q	MINISCRIBE CORP	12	1	2.813	-0.3	-10.0
N	MINNESOTA MING & MFG CO	75	35	73.5	0.5	0.7
Q	PERSONAL COMP PROD INC	6	4	4.5	-0.1	-1.4
Q	PRIAM CORP	2	0	0.469	0.0	-6.2
Q	PRINTRONIX INC	11	7	7.375	-1.0	-11.9
N	QMS INC	11	6	10	0.4	3.9
Q	QUANTUM CORP	25	7	23.75	0.3	1.1
N	RECOGNITION EQUIP INC	13	6	9.25	-0.8	-7.5
Q	REXON INC	8	6	7.375	-0.3	-3.3
Q	SEAGATE TECHNOLOGY	16	7	10.75	-2.0	-15.7
N	STORAGE TECH CORP	26	11	12.125	-0.9	-6.7
Q	TANDON CORP	2	0	0.563	0.1	12.6
N	TEKTRONIX INC	24	19	22.125	-0.4	-1.7
Q	TELEVIDEO SYS INC	1	0	0.25	0.0	0.0
N	XEROX CORP	69	52	66.75	0.1	0.2
	Leasing Companies					
Q	AMPLICON INC	115	11	14.5	-1.5	-9.4
N	CAPITAL ASSOC INTNL INC	9	5	7.625	0.1	1.7
N	COMDISCO INC	29	19	27.625	-0.1	-0.5
Q	CONTINENTAL INFO SYS	5	0	0.563	0.1	20.0
Q	LDI CORPORATION	17	13	16	0.3	1.6
Q	PHOENIX AMERN INC	5	3	4.375	0.1	2.9
Q	SELECTERM INC	9	5	8.25	-0.3	-2.9

EXCH: N—NEW YORK; A—AMERICAN; Q—NATIONAL

Staying back

As the rest of the Street heats up, computer stocks hit the skids

Technological issues failed to join the Dow Jones industrial average as it reached its highest point since the October 1987 crash. Although the outlook for the general economy brightened, analysts are not so optimistic for the computer market's future. Even firms that announced earnings increases were hit hard. Compaq Computer Corp. reported an increase in revenue, yet dropped 4½ points to close Thursday at 87⅝. Microsoft Corp. fell 1½ points to 53¾, despite announcing a 50% rise in its fourth-quarter income. Stratus Computer, Inc. also reported an increase in income and likewise saw its shares fall to 29¾, off 1½ points.

Other firms were hit hard by negative financial announcements. Cray Research, Inc. reported lower earnings than expected; the truth hurt, though, as Cray dropped 2⅛ points to close at 41¼. Prime Computer, Inc. posted a second-quarter loss, which rattled the armor of potential white knight J. H. Whitney and led to a 2⅜-point drop; Prime closed at 16¼. Data General Corp.'s quarterly losses triggered a 1¼-point drop to 17. Ashton-Tate Corp. announced revenue losses larger than it had predicted; its shares fell 1 point to close at 15¼.

Not even Digital Equipment Corp. and IBM were immune to the week's losses. DEC fell 2 points to finish at 92¾, and IBM closed at 113, off 1⅛ points.

JOSEPH J. FATTON

IBM software spree continues

BY AMY CORTESE
CW STAFF

In the largest of a recent wave of technology investments, IBM invested $116.5 million in Policy Management Systems Corp. (PMSC) last week, giving it nearly a 20% equity interest in the insurance software supplier.

PMSC, based in Columbia, S.C., is a leading supplier of applications software for property and casualty insurance firms. IBM's investment in the firm, which amounts to more than half of PMSC's $217 million in revenue last year, will infuse it with the capital needed to accelerate a development plan under way that will take advantage of IBM's Systems Application Architecture (SAA).

IBM said it would assist PMSC in "quickly converting" several PMSC applications to SAA. Under terms of the agreement, IBM will provide people, hardware and systems software to help PMSC develop insurance applications and expand internationally, according to a PMSC spokesman.

Largest interest so far

IBM has taken minority equity interests in several software firms recently, but PMSC is the largest yet. These investments are seen as an effort by IBM to boost acceptance of SAA by ensuring applications availability.

"IBM cannot do everything," said Rick Sherlund, vice-president of investment research at Goldman Sachs & Co.

Just a couple of years ago, IBM's software revenue, at growth rates of 20% to 30%, had been a bright spot for the company in the face of sluggish hardware sales. The promising outlook prompted IBM to set a goal of generating half of its revenue from software by the early 1990s. However, IBM's latest financials show that those rates have slowed to a modest 9% growth, according to Cato Carpenter, an analyst at Alex Brown & Sons.

Starting with the creation of the Applications Systems Division in 1987, IBM has stepped up its efforts to provide applications solutions developed both internally and by third parties. IBM has directed its own development efforts at specific areas such as office automation, and the firm has strengthened relationships with independent software vendors in other areas.

IBM's new style of taking a minority interest in companies that are developing applications for its platforms is a departure from previous practices.

Its past investments typically took the form of joint ventures, as with Hogan Systems, Inc., or outright purchases, as with Rolm Systems, but were seldom successful. IBM's bureaucratic culture often snuffed out smaller, more entrepreneurial companies, Carpenter maintained. Under its new style, "IBM's plan is to influence and provide capital, not to manage," he said.

Analysts said the move signals a renewed interest in vertical markets, coming as it does only two weeks after an investment in American Management Systems, Inc., a firm that, among other things, sells banking software. After an earlier deal with banking software supplier Hogan Systems failed to produce the desired results, IBM invested largely in technologies with broad applications, such as image processing and graphical user interfaces.

Sherlund said the PMSC relationship is strategic for IBM because it gives IBM influence over the market leader of a niche market. Analysts expect IBM to invest in more companies serving vertical markets.

An IBM spokesman said the insurance industry is an important customer segment for IBM and that the deal with PMSC would help hasten development of insurance applications. Approximately $3 billion is spent annually on information systems in the property and casualty industry, Carpenter estimated.

Recent targets
PMSC is latest in IBM's flurry of investments in software firms

Date	Company	Value of investment
July	Policy Management Systems	$116.5M
July	American Management Systems	$18M
June	Image Business Systems	$6M
June	I/NET	$4.3M
June	Computer Task Group	$21.1M
May	Management Science America	$10.1M

CW CHART: JOHN YORK

3380

FROM PAGE 1

nology, Inc., the IS division of CSX Corp. "Within the next 90 days, we have to have a strategy in place, with or without them."

Cooper said he would consider high-end storage products from competitors such as Amdahl Corp. and National Advanced Systems. "We'd evaluate them now," Cooper said. "With this news, the door was flung open for other evaluations."

Meanwhile, industry analysts expressed little confidence that IBM would be able to fix the product in time for a significant volume to ship this year.

Jim Cassell, vice-president of large systems service at Gartner Group, Inc., said the problem is "not a quick fix," and it could take as long as six to nine months before the disk drive ships. If IBM had succeeded with its initial rollout schedule, it could have shipped at least 5,000 units this year, he said. At an estimated average cost of $250,000 per unit, and projecting that the delay will require lower prices on 3380 drives, "this could impact 1989 revenue by more than $1.5 billion," he said.

Thomas Donovan, an analyst at the Financial Services Corp. division of International Data Corp., also projected IBM could have shipped as many as 5,000 units this year.

Jay Stevens, an analyst at Dean Witter Reynolds in New York, said he downgraded his estimate for IBM's earnings this year by 10 cents because of last week's cancellation. "It's a very important product," he said. "Its volume could have been high, and it also has high margins."

> THE NEW DISK drive represents a major leap in disk drive technology.

The new disk drive represents a major leap in disk drive technology for IBM and is expected to sport several advances over the current high-end drive, the 3380 K. Although IBM has not released the product specifications, analysts have long expected that the drive would accommodate at least 15G bytes of data, which is double the capacity of the K drive.

The drive, commonly referred to as the 3390, is expected to use either 9½- or 10½-in. platters, whereas the K drive uses 14-in. platters. The physical size of the new drive will be smaller, and it will feature a data transfer rate of 4M or 4.5M byte/sec., observers said. The K drive has a 3M byte/sec. data transfer rate.

Observers said that with all these changes, any number of problems could have cropped up. With IBM keeping quiet as to exactly what the problem is, speculation is running rampant. Some analysts claimed the difficulty lies with the microcode, while others said it is a problem with the hardware components.

Analysts speculated that IBM may have speeded up its efforts to release the product to take advantage of pent-up demand and give year-end revenue a badly needed kick. Rumors have circulated for months that the new drive would soon be introduced. As a result, users have either put off purchases of new K drives or bought lower end 3380 drives on the used market to get by until the new one arrives.

The used market for low-end 3380 drives has picked up considerably in the last several months, with A and E drives now selling for $10,000, as compared with the February rate of $3,000, Donovan said.

For now, Gartner Group will recommend that users no longer put off purchasing new K-class drives from either IBM or competitors, according to Cassell.

A boost for 3480

IBM last week kept its word to improve its 3480 tape drive with the announcement of a new feature that reportedly boosts performance by 70% and will allow users to pack up to five times more data on a tape cartridge.

IBM first announced its 3480 plans last year, and a spokeswoman had said earlier this year that the enhancements would be out in the first half of 1989. Last month, the spokeswoman corrected her earlier statement and said IBM had always intended to release the 3480 improvements in the second half of the year.

The Improved Data Recording Capability, which will provide the 3480 with the performance boost, will be offered as a field upgrade for $17,500 and will be sold as a feature on 3480s for $15,000. Availability is scheduled for September.

IBM said 3480s equipped with the new feature will be able to read and write to customer's existing 3480 cartridges.

New IBM board to force down 1M-bit chip price

BY PATRICIA KEEFE
CW STAFF

WHITE PLAINS, N.Y. — A newly introduced memory expansion board using IBM's 4M-bit memory chip is expected to push down pricing for 1M-bit memory chips.

IBM unwrapped the Personal System/2 Enhanced 80386 Memory Option (a) last week. This feature uses 1M- and 4M-bit chips and can be installed in PS/2 Model 70s, Model P70s and Model 80s.

Initially, the card will be configured with either 2M or 4M bytes of memory and will be able to accommodate three additional 1M-, 2M- or 4M-byte memory modules. A single card could support up to 16M bytes of memory, the addressable memory limit on the desktop today.

Priced at $1,795, the 2M-byte card is available now. Its 4M-byte sibling, priced at $3,495, and additional 4M-byte memory modules ($3,095) will ship in limited quantity this year, with general delivery available for the first quarter of 1990.

Starting with the PS/2 line, IBM will expand use of the 4M-bit chip to "several IBM systems currently being tested," and the firm will introduce the chip across its entire product line in 1990, said Patrick A. Toole, IBM senior vice-president and general manager of technology products. A fall RT announcement is expected to highlight the 4M-bit chip.

Analysts generally consider the 4M-bit chip too pricey. John McCarthy, research director at Forrester Research, Inc. in Cambridge, Mass., said that 1M-bit chips can be had for $200. "There are cheaper ways to upgrade," agreed Mark Levitt, an analyst at International Data Corp., a market research firm based in Framingham, Mass.

There is also the potential to assist in IBM's campaign to make memory-intensive OS/2 more palatable, said Jack Karp, a vice-president at Meta Group, Inc., a Westport, Conn.-based consulting firm.

"Applications up and down the board require more memory today. These chips are the most efficient way of supplying that right now," Karp said.

Prime proxy battle postponed

BY NELL MARGOLIS
CW STAFF

NATICK, Mass. — The prolonged battle for control of Prime Computer, Inc. was supposed to end last week. But instead of a long-awaited resolution, last-minute questions about the viability of a management-backed sell-off left observers totally baffled about how and when the convoluted tale will end.

Prime users, meanwhile, remain in limbo, where they have languished since the hostilities began last November.

In the hours before Prime was to have held its twice-postponed annual meeting — slated as the site of a hostile proxy fight for control of Prime's board waged by MAI Basic Four, Inc. — the following events occurred in quick succession:

- At the urging of the Securities and Exchange Commission, according to Prime executives, the board determined that shareholders needed additional time to consider the terms of MAI's midmonth offer to buy only the company's minicomputer business. About an hour before its scheduled start, Prime again postponed the annual meeting — this time until Aug. 9.
- Prime's board unanimously deemed the pending offer from venture capital company J. H. Whitney & Co., the long-sought friendly acquisitor-hopeful with which Prime has already contracted to merge, "economically superior" to either MAI proposal and urged shareholders to tender their shares to Whitney.
- Prime reported a $19 million loss on revenue, down 7% from last year's comparable quarter.

Chief Executive Officer Anthony Craig, addressing shareholders at a 90-minute "non-meeting" that was held for those shareholders who had not been headed off at the pass, called the uninspiring numbers "the same kind of results as [Prime reported] for the first quarter and for the same kind of reasons" — the high cost of warding off MAI.

Extraordinary expenses incurred on the antitakeover trail, including reimbursing white knight Whitney for $20 million in expenses, totaled approximately $27.3 million for the quarter, Craig said. The bill threw a pretax operating profit of approximately $10 million onto the red side of the ledger.

Meanwhile, the two banks backing the Whitney offer apparently had a harder time rationalizing Prime's second consecutive dismal quarterly showing.

Chemical Bank and The First National Bank of Boston upped the ante on Whitney. They said they were not satisfied that the committed amount of equity and debt would now be sufficient to meet both the financing requirements of the proposed buyout itself and Prime's ongoing needs.

As of last week, Whitney has been under orders to "obtain commitments for substantial additional postmerger debt and equity financing prior to funding under the banks' existing commitment," said Whitney partner Don E. Ackerman in a prepared statement.

MAI still on mini trail

According to the statement, Whitney is now negotiating with a "major financial institution" in an effort to secure the required funds. Neither Whitney nor MAI was available for comment, although MAI issued a statement Thursday that it was allowing its stock tender bid to expire and would continue with its more recent plan to win Prime shareholder proxies to elect a slate of directors committed to selling the company's minicomputer operations to MAI.

"We still feel that Whitney's offer is the best offer," Prime spokesman Joe Gavaghan said.

"It's a mess," summed up John W. Adams, an analyst at Adams, Harkness & Hill, Inc. in Boston. Adams said it is premature to suppose that the Whitney offer will fall out of the picture, but that it is not inconceivable. If it does, "Prime could be right back to square one," he said.

In the wake of MAI's withdrawal of its tender offer, Prime issued a statement Friday saying MAI had expressed a willingness to continue the tender offer. Whether through tender or acquisition of the minicomputer business only, Prime said, MAI suggested it should be reimbursed for $25 million in expenses if it obtains extensions of its financing commitments.

Whitney said Friday it had extended its tender offer to Aug. 4. If the Whitney offer closes between now and Aug. 9, Whitney could walk into the August meeting as the sole stockholder of Prime; as of Thursday, however, only about one-fourth of the shares had been tendered.

Prime cuts

Since MAI's repeatedly spurned offer to buy the entirety of Prime expired last Thursday, Prime has two deals left on the table

MAI Basic Four offers:

- **$450 million in cash and $150 million in debentures for Prime's minicomputer business.**

J. H. Whitney & Co. offers:

- **$1.06 billion in cash for 49.5 million shares; $22 face amount of debentures for up to 13 million of the remaining shares.**

CW CHART: JOHN YORK

Wang

FROM PAGE 1

that the company's bankers will begin to exert pressure. "Once they announce that loss, they will be in technical default of their bank agreements," explained a source close to Wang.

"The company is violating at least one of its bank covenants" — the conditions attached to an agreement under which a bank agrees to lend money — said Shao Wang, an analyst at Smith Barney, Harris Upham & Co. Revised credit terms are likely to require changes in the company's business plan to enhance financial stability.

Wall Street seemed split over whether Wang will be forced to sell out or whether the banks will settle for a minority investment. Analysts said the latter would be the easiest and hence the most likely course of action.

"A financial restructuring is in the wind," said Michael Geran, an analyst at Nikko Securities Co. International in New York. "People jump to the assumption that they will be sold, but you have to look at the attractiveness of minis today," he said, referring to flagging revenue and profits among major vendors.

Also blocking the likelihood of a sale is the fact that the Wang family controls 80% of stock voting rights.

Some analysts who urged Wang to bite the bullet and cut costs last quarter now predict the company will be sold within six to 12 months, most likely to an Asian vendor attracted to Wang's installed base.

"They know the numbers — it's just a question of who they'll sell to," said Jeff Governman, a financial analyst at Soundview Financial Group in Stamford, Conn.

"I don't buy all this talk about a white knight," added John McCarthy, director of research at Forrester Research, Inc. in Cambridge, Mass. He was referring to reports that Xerox Corp. and a number of Asian companies are interested in Wang's Freestyle desktop product.

Pressure building

Regardless of which path the firm takes to reverse its financial straits, Wang is under tremendous time pressure, according to former Wang President John Cunningham, now president of Cunningham & Co., consultants specializing in acquisitions, mergers and turnarounds.

"The next year is a critical and important one for them," Cunningham said. "They have got to get the business stabilized and back on track."

Specifically, Wang needs to pare down the business to a size that it can support, he said. That means cutting back products and projects that are not going to generate short-term profits, Cunningham added.

Companies that remain committed to proprietary architectures have burdensome R&D and support costs, Cunningham said. "It's the same struggle that Data General is having and part of what DEC is doing," he added.

From a broader perspective, Wang's loss only adds to the flood of red ink that is fast engulfing "America's Technology Highway," as the Massachusetts computer region is known (see stories pages 65 and 92). One analyst ruefully noted that the only lower bond rating than Wang's right now belongs to Massachusetts.

Analysts were quick to note that the overall financial picture for these companies is unlikely to improve, given both a probable economic downturn and heavy spending among users over the last two years.

Wang has instituted cost-cutting programs, most notably the elimination of the 3,000 positions. Not only were these cuts not enough, but they also boomeranged as related expenses negatively impacted the bottom line. Analysts predict more layoffs will follow.

Wang sources said another 3,000 to 5,000 layoffs are rumored, particularly in manufacturing.

Smith Barney's Wang said those numbers are realistic. The company's revenue per employee ratio trails the industry average of $120,000 to $130,000 and is even further behind the minicomputer industry average of $180,000 to $190,000, he said. "At $100,000 per employee, Wang's average is at the low end of the range for the industry," the analyst said, adding that Wang can stand to lose 20% of its existing staff.

Loss factors

Wang's most recent losses are commonly attributed to four factors:

- Severance costs related to substantial layoffs.
- Lowered service revenues because of both the strength of the U.S. dollar and a dwindling installed base.
- Low revenue combined with high expenses.
- Write-offs related to discontinued operations and other factors.

Additionally, the company's "inventory level is still much too high," Governman said.

Unfortunately for Wang, cost-cutting efforts are effective only to a point, he added. The real problems now, analysts said, are the lack of incoming revenue and flight of the installed base. "They can't sell the old line, and the new stuff isn't picking up," McCarthy said.

Past Gartner Group, Inc. customer surveys, including one in June, show users are either taking Wang off the short list or spending less with Wang in general, and many plan to make fewer Wang purchases in 1990 than they did in 1989.

Cray, Hitachi ink licensing agreement

BY LORI VALIGRA
IDG NEWS SERVICE

Cray Research, Inc. and Hitachi Ltd. have finalized a technology cross-licensing agreement for supercomputers.

Press reports in Japan, which a Hitachi spokesman said are "correct to some extent," said the agreement was reached in May and signed later. Cray's Japanese subsidiary is not involved directly in the negotiations, according to Tsutomu Watanabe, assistant to the president. The accord is believed to be Cray's first licensing contract with a Japanese company.

A Cray spokesman in Minneapolis said it has other cross-licensing deals, including ones with IBM and Convex Computer Corp. Hitachi and Cray will continue as competitors but will now run less risk of legal entanglements, according to the spokesman. The pact should not be viewed as a technology-sharing agreement, he said.

According to reports in Japan, the cross-licensing contract covers supercomputer hardware technology, including design information of the processing unit. Additionally, it is to cover patents held currently by both companies and future patents for supercomputing technology.

The Cray spokesman said the deal will involve no cooperative efforts at all.

Senior Editor Rosemary Hamilton contributed to this report.

China's Stone Group feels government fist

BY CHRIS BROWN
IDG NEWS SERVICE

HONG KONG — China's largest private company, the Beijing-based Stone Group, is suddenly struggling for survival following a government crackdown on the firm in retaliation for its supporting the pro-democracy movement earlier this year.

Former general manager Wan Runnan, who founded the Stone computer company in 1984, was among the first of the intellectuals named by the Beijing Martial Law Command as an instigator of last month's demonstrations.

Wan is currently in Paris with a group of dissident leaders, including Yan Jiaqi and student leader Wu'erkaixi, and he is reportedly working in the China Democratic Front movement, which is set on ousting the current Beijing regime.

Meanwhile, the Stone Group has voted to remove Wan from its board of directors in an attempt to distance itself from the democracy movement. Taking Wan's place is Shen Guojun, a former deputy general manager at the Stone Group.

"As a company, the Stone Group is no longer involved in politics," said Wang Anshi, another Stone Group deputy general manager who was quoted in a recent "China Informatics" report published by International Data Corp. (IDC) China.

It is widely known that the Stone Group had supported the students in Tiananmen Square, supplying them with power generators, loudspeakers, printing equipment and funding. In addition, several intellectuals from the Beijing Stone Social Research Institute, a subsidiary of the Stone Group, had urged the government to call a special meeting of the National People's Congress to discuss the student demands.

Shortly after the violent crackdown, the Beijing Martial Law Command listed Wan and other intellectuals as instigators of the democracy movement and posted their pictures in airports and train stations throughout the country. By the time his name appeared on the list, Wan had already escaped China through Hong Kong.

In addition to Wan, three of Stone's eight deputy general managers have also been put on the wanted list and have been in hiding since June 6, according to IDC. It is unclear what has happened to the three. Meanwhile, the Stone Group is carrying on in the face of government investigations.

Two weeks after the military onslaught, the Chinese government sent a 20-person team to investigate Stone's accounts to determine if the firm had shifted funds to support the democracy movement. Although the team turned up no evidence of this, the government decided to freeze two of the firm's 30 accounts — including its advertising budget account, which was unfrozen 10 days later.

There were also serious discussions about whether the Chinese government should take control of the Stone Group, although Wang says this proposal has now been dropped.

Stone is currently revising its long-term plans. Before the uprising, the firm had hoped to enter into a joint venture with Japanese firm Mitsui, U.S.-based Unisys Corp. and the Yunan Electronic Equipment Factory in Kunming to manufacture minicomputers in China. Unisys is currently said to be reconsidering the venture. Stone will proceed with its agreement with Japan-based Sharp Electronics Corp. to develop an electronic English-Chinese dictionary, the "China Informatics" report said.

Wang said that the new Stone Group will no longer be concentrating on high growth rates and turnover but will look to develop new products and build up production facilities. "China Informatics" called such a strategy a logical result in the face of China's current economic troubles.

Real-time SunOS ships to U.S. Navy

BY JEAN S. BOZMAN
CW STAFF

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. is weighing anchor for the U.S. Navy with a real-time version of its SunOS operating system. However, it will not ship out similar capabilities to commercial users until some time after AT&T's Unix System V, Release 4 ships this fall, company officials said last week.

The Navy project, part of a $115 million contract for shipboard microsystems, precedes the near-term inclusion of more real-time features in SunOS and in AT&T's current version of Unix System V. "The government wants real-time Unix, but so do a lot of other users," said Gary Oing, director of product marketing at Sun's federal division in Milpitas, Calif.

"They want a Unix that can more predictably respond to interrupts."

Speaking at Sun's Sunexpo conference last week, Bill Joy, vice-president of Sun research and development, said many users are not prepared to view Unix as a contender in the real-time arena.

"Many people don't want to believe Unix is a real-time system, and unfairly so," Joy said. "But System V.4 has some new scheduling stuff in it that makes it act like a real-time system," said Joy, who led a team that created Unix System V, Release 4 by merging Unix System V, Release 3 with Xenix and Unix 4.2 from University of California at Berkeley. "I believe it will be an improvement, especially in large-scale systems."

Once Unix System V, Release 4 ships, Sun will port it to the mainstream SunOS product, importing more real-time features in the process, Sun executives said. Sun's federal division could not wait for that, Oing said, because benchmarks for the Navy project had to be conducted last winter. "We had delivery requirements on that contract that couldn't wait for AT&T's delivery of V.4," he said.

Traditionally, Unix has been a time-sharing, multiprocessing system. As such, it juggles many tasks simultaneously, rather than guaranteeing that particular processes get priority treatment. "Unix has fairly high overhead involved with switching from one task to another," said Omri Serlin, president of Itom International in Los Altos, Calif., and a close follower of the on-line transaction processing industry. The task-switching delay is on the order of hundreds of milliseconds, Serlin said.

Unix System V, Release 4 code addresses that problem by minimizing the interruptions to less than 20 msec, said Sri Rajeev, product manager of SunOS. "The fundamental problem is you have multiple processes, and there's always the chance one will get preempted," Rajeev said. "In System V.4, you can declare that a given process is not to be interrupted. That way, the overhead associated with task switching is eliminated."

In the future, Joy wants to add extensions to Unix that will make it better suited to transaction processing, Oing said. The task of evolving Unix into a transaction processing system to rival mainframes would probably require years of development, he added.

Sundown

Sun officials conceded last week that the firm's net loss for the fourth fiscal quarter could go as high as $26 million and that a return to profitability is unlikely in the current quarter.

Although a detailed fiscal report for the quarter and year ended June 30 will not be available until late August, the workstation maker also gave early indications that full-year earnings per share would likely be 72 to 78 cents, down from the 89 cent-per-share figure recorded in fiscal 1988.

A botched internal management system cutover that delayed thousands of orders this spring has been blamed for the monetary troubles that now envelop the once-stellar company.

Sun officials also indicated, however, that fiscal 1989 revenue should land between $1.75 billion and $1.77 billion, up from fiscal 1988 revenue of $1.05 billion.

JAMES DALY

Novell rolls out Named Pipes support

BY PATRICIA KEEFE
CW STAFF

PROVO, Utah — Microsoft Corp.'s OS/2 LAN Manager got a boost from an unlikely source last week as Novell, Inc. finally attached a ship date to its promised support of LAN Manager's Named Pipes application programming interface.

The Netware Requestor for OS/2 V1.1 will ship in August for a one-time corporate fee of $200. Upgrades from V1.0 are available free of charge, the firm said. Named Pipes support will enable the Netware network operating system to support such OS/2 server-based applications as the Ashton-Tate/Microsoft/Sybase SQL Server.

Novell's support for Named Pipes, following IBM's recent endorsement within Officevision products, establishes it as a de facto programming interface for client/server applications, according to analysts.

"It's one less question for programmers to deal with," according to Mary Modahl, an analyst at Forrester Research, Inc. in Cambridge, Mass.

Still missing from Novell's arsenal, however, is support for OS/2 file servers, as opposed to application servers. Novell is targeting the first quarter of 1990 for delivery of a version of Netware 286 V2.1.5 that will run in the server along with a 16-bit OS/2.

Novell has other problems on its plate, Modahl said: "They have some tough development work ahead of them before they can support Officevision." Users have been very receptive to Officevision, which is one reason Novell is becoming much more vocal about Named Pipes support, she added.

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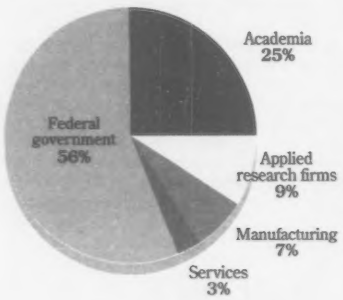
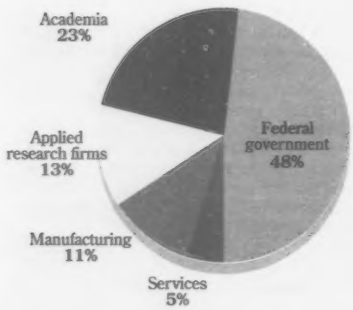
TRENDS

Government spending may continue to have the most significant effect on TCP/IP expenditures, but private sector interest has increased steadily, according to a Newton-Evans survey.

Market breakdown



1989
Total value:
$560 million

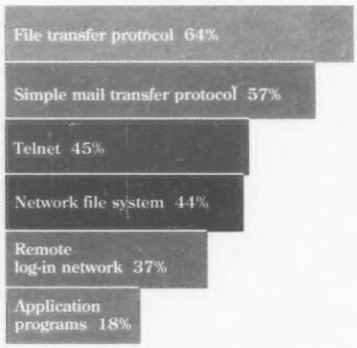


1993
Total value:
$400 million

▲ **Private sector users** *will increasingly account for larger shares of the TCP/IP expenditure as the market shrinks. Even with OSI on the way, TCP/IP looks likely to be a force through the mid-1990s.*

Top TCP/IP applications

Percent of respondents (Base of 66)



▲ **While industrial sites** *reported file transfer as the most prevalent TCP/IP application, the academic community highlighted the importance of mail transfer.*

Plans for migrating to OSI

Number of respondents (Base of 64)

▲ **Out of the 29 companies** *that plan to migrate to OSI, 20 of them plan to make the move in the next three to five years.*

SOURCE: NEWTON-EVANS RESEARCH CO. ELLICOTT CITY, MD.
CW CHARTS: TOM MONAHAN

INSIDE LINES

Put stock in this

Rumors were flying fast and furious last week in the wake of Wang Laboratories' decision to hold off until today on releasing its year-end financial results. A source close to Wang reported that company founder Dr. An Wang is said to have pledged all his Wang and IBM stock to the banks. "An Wang is supposed to have the largest private holding of IBM stock," the source said. Also circulating are reports that Ian Diery, executive vice-president, and Kenneth Olisa, vice-president of world marketing, have tendered their resignations but were asked to reconsider.

Antecedents resolved

Gartner Group's Michael Braude, who showed up on a Dun & Bradstreet listing of the board of directors at MVS Software, and was described as having "antecedents undetermined," was included by mistake, according to MVS. The company said the error has been reported to Dun & Bradstreet, and Braude's name will be removed. MVS, which has been favorably mentioned in a Gartner Group report, said it believes a clerical error was at fault, and we'll deliver the rest of the explanation verbatim: "Approximately a year ago, MVS . . . began a wish list of industry experts who might be considered for positions on the board. Owing both to Mr. Braude's expertise and to the fact that he is a colleague of one of the outside directors of MVS Software, Mr. Braude's name appeared at the top of the list. Somehow this wish list was provided to Dun & Bradstreet rather than the list of directors. Due to the conflict of interest, Mr. Braude does not accept positions on the board for any company in this industry. MVS Software both understands and agrees."

Shining up the Apples

Look for Apple to spice up its product line by late September with at least two major rollouts. The long-awaited portable Macintosh may be clunkier and pricier than most had hoped for — the new product weighs around 15 pounds and sports a price tag of more than $6,500. On the other hand, the Motorola 68030-based Macintosh IICI should be a speedier heir to the existing IICX. Still, with Apple having trouble keeping up with orders for the IICX, it's anyone's guess how long it will be before itchy users can really get their hands on the new machines.

Cyclone delay in the wind

Tandem's 100 MIPS-plus transaction processing machine may be delayed again. First expected this month, glitches in software development delayed it until September. It now may be delayed even further. The stumbling block lies in how the operating system deals with a massive increase in I/O, from two to three channels per CPU, and the change from a 3-bit, 8-device load per controller to 8 bits and 256 devices.

Ready whenever you are

Novell will have its hands full trying to get an assortment of products out the door over the next two quarters. However, just because it has its nose to the grindstone doesn't mean it can't look to the future. Last week, the vendor said it plans to port a version of Netware 386 — which is supposed to ship next month — to 32-bit OS/2 386 when it becomes available. Novell has no idea when that will be, and Microsoft is not saying. In the meantime, Novell may be better off concentrating on bigger, more dangerous problems — such as IBM's Officevision. Much of Novell's installed base is entrenched in IBM Token-Ring sites — prime targets for Officevision sales. "Officevision could be poison to Novell," said Mary Modahl, an analyst at Forrester Research in Cambridge, Mass.

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NEXT WEEK

Doing more with less has been the modus operandi at Kawasaki Motors Corp. The IS management team has cut its staff nearly in half in the last decade while developing networks for dealers and salesmen. A look at the Japanese motorcycle giant's IS strategy and colorful U.S. management team appears in Manager's Journal.

ALAN LEVENSON

What are the new connections that may help the Macintosh network its way into a position of prominence in the corporate world? Will the Mac's transformation into a serious platform for artificial intelligence help convert disbelievers? Find out the answers when Product Spotlight turns its beam on the Macintosh market.

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- **Customizing in the Age of Automation.** Customizing products in an assembly line fashion — systems that let customers specify options.
- **Future Network Technologies.** How integration strategists are preparing for widespread implementation of technologies such as imaging, digitized voice and real-time data collection.
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Who buys PC's? It's a matter of influence.

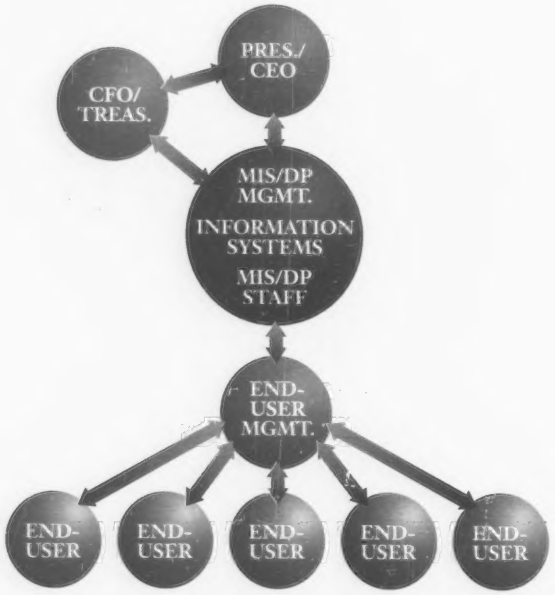
PC's are an integral part of a corporation's total Information System. Buying PC's and related products and services cannot be attributed to one person or department within Corporate America.

The purchase process is a dynamic one, moving through various spheres of influence as PC's and products are initially requested, up to the final selection and approval of their purchase.

IS Management — the crossroads for decision making.

It is IS management who plays the pivotal role in the selection, acquisition, and implemention of PC products and related services. Purchase activity begins with end users initating requests. But the decision process for determining requirements, reviewing and specifying products, and in most cases, approving purchases, falls within the domain of IS management and their staffs.

What this group selects, acquires and implements must help the corporation improve productivity and gain a competitive edge. And this powerful influence is paralleled across all major industries in America.



A recent vertical markets study* looked at the purchase process for computer systems and computer-related products across ten vertical markets. One objective of this study was to examine the purchase process specifically for PC's and related products. As shown in the chart below, the "spheres of influence" all have involvement in the buying process. But it is at the critical stages of specifying products and approving purchases that you see IS management's heaviest involvement.

The study also measured readership of trade and general business publications. When asked what publication they considered most useful, respondents ranked *Computerworld* as the most useful.

Levels of Management Involved in Purchasing Process for Personal Computers and Related Products

	PRES/ CEO	CFO/ TREAS	MIS/DP MGMT	MIS/DP STAFF	END-USER DEPT MGMT	END-USER STAFF	OTHER
Initiate Request	8.2%	11.4%	**39.4%**	**35.7%**	72.9%	62.8%	2.1%
Determine Need	4.1%	7.8%	**49.2%**	**46.2%**	62.1%	43.9%	2.4%
Determine Requirements	1.9%	4.4%	**51.0%**	**59.5%**	47.8%	36.0%	2.0%
Review Products	2.1%	5.1%	**62.3%**	**63.3%**	39.3%	29.9%	2.5%
Specify Products	1.9%	4.2%	**63.0%**	**49.9%**	29.0%	18.1%	2.7%
Approve Purchase	34.6%	44.7%	**62.8%**	**8.6%**	29.3%	3.6%	5.4%

(Total Respondents 1,735)

*Source: "The Purchase Decision Process for Computers and Computer-related Products Within Ten Vertical Markets, May 1989."

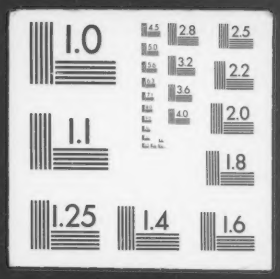
Most Useful Publication

Publication	Total (1,366)
Computerworld	**27.4%**
MIS Week	6.1%
InformationWEEK	5.9%
Wall Street Journal	5.6%
PC Week	3.3%
Datamation	2.9%
CIO	2.6%
News 3X/400	2.3%
InfoWorld	2.1%
Computers in Healthcare	2.0%
Other	32.7%
None in Particular	7.1%

Note: Those publications receiving less than 2% are grouped in the "Other" category.

*Source: "The Purchase Decision Process for Computers and Computer-related Products Within Ten Vertical Markets, May 1989."

For more information on the PC purchase process, as well as other information contained in this study, contact Val Landi, Senior Vice President/Associate Publisher at (508)879-0700, or your *Computerworld* sales representative.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